

The Mining And Metallurgical Journal

VOL. XXII. No. 6

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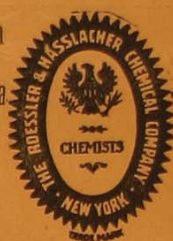
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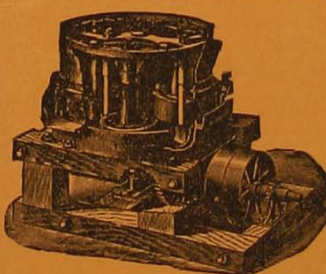
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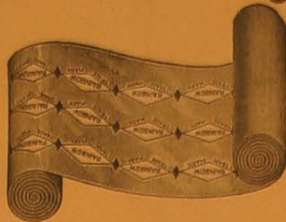
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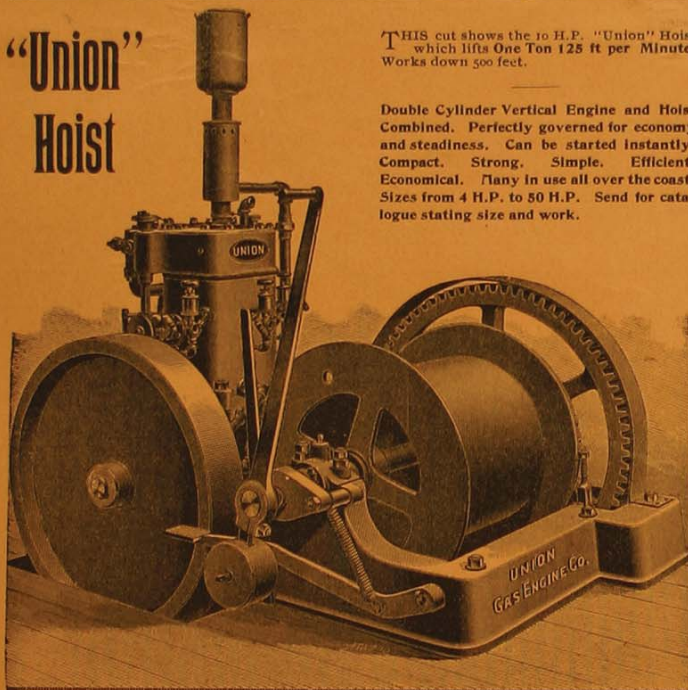
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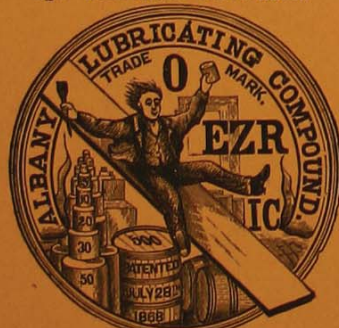
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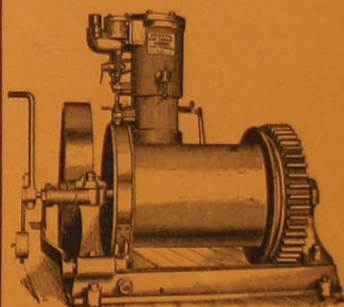
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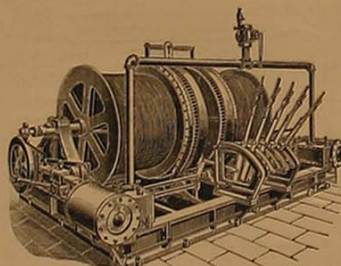
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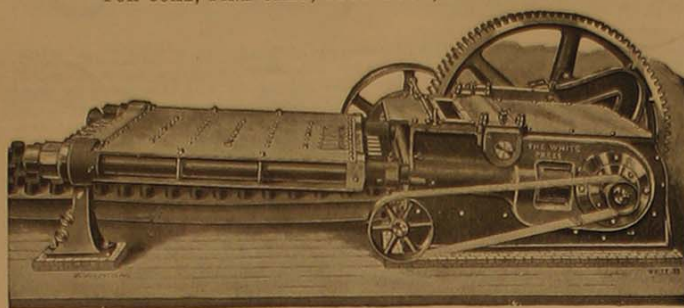
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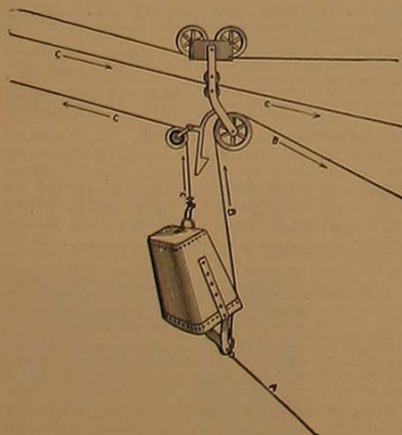
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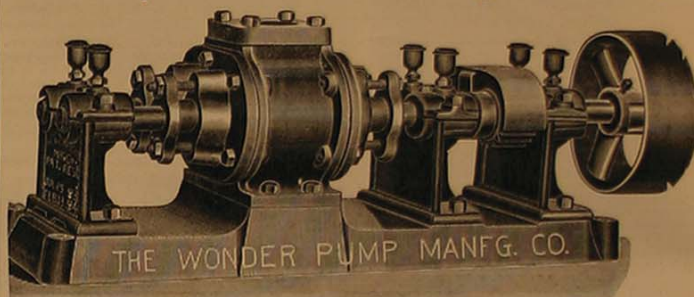
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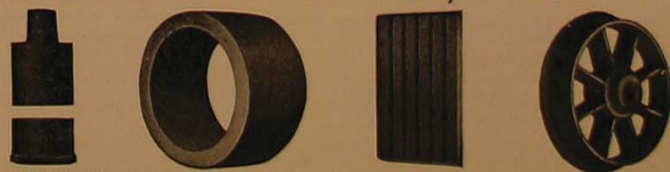
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CALIFORNIA STATE MINING BUREAU.

The trials and tribulations of State Mineralogist Cooper are not at an end yet, but a little energy displayed will set the wheels of justice moving in the right direction.

The Register of Mines and Minerals which was in process of compilation has not been printed, because the State Printer has so much useless matter to print that there is no time to spare for the valuable work of the State Mining Bureau.

Now the Bureau is without funds, and can do nothing at all. The following, taken from the San Francisco *Call* portrays the situation as it stands :

The miners of the State will be delighted to learn that the State Mining Bureau is in an inchoate and dirty political mess as the result of a bold but fool patronage grabbing play by a few politicians with Governor Gage apparently playing the role of chief bandit. This important State institution, from which the mining interests rightly expect much, is paralyzed and has been for months, so far as its most important functions go, as the result of an attack by the spoilsmen. The bureau has suffered more or less from the curse of practical politics before, but now it seems completely mired in this familiar slough.

"California now has two State Mining Bureaus at loggerheads with each other. One—the old one—is mired at the ferry building with just enough money to keep open and in quiet operation the fine museum, library, assay laboratory and Bureau of Information with which it is equipped by law and in fact, but with no money to go out into the hills and deserts with the miners who need its aid. The other is a new one, run by Governor Gage, fancy free, with \$20,000 and all outdoors.

"Then there comes into view in the rear the interesting development that this new gubernatorial bureau of science and industry is probably illegal and that its \$20,000 will probably be taken away from it by the courts whenever anybody makes a legal assault on it, as somebody is likely to do before it acquires a very long history. And while viewing these troubled institutional twins one may hear the political pulls fairly creaking as the mess grows more involved."

CONGRESS IN SESSION

There have been hints thrown out for months as to what the majority in Congress would do on the money question, but nothing very definite could be learned though the whole country was anxious to find out what would likely transpire. Self-constituted committees of both the House and Senate have had the subject under consideration, and at the very opening of Congress the bill proposed by the Senate committee is promulgated, and hence the country is definitely advised of its character. There are some differences between the two committees of the Republican party which have had the subject under consideration.

The bill of the Senate Committee provides in substance :

First. That the dollar consisting of 25.8 grains of gold nine-tenths fine shall be the standard unit of value, and that all forms of money issued or coined by the United States shall be maintained on a parity of value with that standard, and that all United States notes and Treasury notes issued under the Act of

July 14, 1890, when presented to the Treasury for redemption shall be redeemed in gold coin of such standard.

Second. For this purpose the Secretary of the Treasury shall set apart \$150,000,000 in gold coin to be used only in redeeming the notes above mentioned, and when thus taken in they shall not again be issued, except on receipt of an equivalent in gold, and should the Treasury in other ways be unable to obtain gold to maintain the reserve of \$100,000,000 in gold, it is made the duty of the Secretary of the Treasury to borrow money on the credit of the United States by the issue and sale of bonds; the bonds to be of the usual denominations and bearing interest at three per cent.

Third. It is made the duty of the Secretary of the Treasury as fast as silver dollars are coined under the Acts of July 14, 1890 and June 30, 1899, from the bullion in the Treasury to retire and cancel an amount of Treasury notes equal to the silver dollars so coined and on which shall be issued silver certificates.

Fourth. That after the passage of the act no United States or Treasury notes shall be issued of less denomination than \$10, and when notes of a less denomination shall be received in the Treasury they shall be cancelled. No silver certificates shall thereafter be issued in less denomination than \$10, and when such are received they shall be cancelled and \$10 certificates issued in their stead.

Fifth. The bill contains provisions authorizing the Secretary of the Treasury to refund the outstanding bonds bearing five and four per cent interest by the issuance and sale of new and long time bonds bearing interest at two per cent.

Sixth. It authorizes the National banks to issue notes to face value of their deposited bonds instead of ninety per cent as now allowed by law, and in case the bonds go below par in the market, the Controller of the Currency may require an additional deposit of bonds to cover the deficiency. After the passage of the Act the banks should not issue notes under \$10.

Seventh. When the National Banks shall deposit two per cent bonds as security for their circulation, they shall pay a tax of one-fourth of one per cent each six months on their circulation, instead of the one per cent tax now imposed by law.

It is understood that the bill of the House Committee contains provisions of a somewhat different character, but generally in principle it concurs with the Senate bill. As the discussion proceeds in Congress we shall have something to say in regard to the general principles of the bill and cognate measures, which the majority in Congress seems disposed to introduce into our financial system.

The bill is ingeniously drawn to avoid rugged issues in the next presidential campaign, and yet in the opening sections there are declarations that tend to the taking of more radical and sweeping steps than are indicated in the subsequent sections.

INTERNATIONAL MINING CONGRESS.

The third annual session of the International Mining Congress, to be held in Milwaukee, Wis., in June, 1900, on the 19, 20, 21, 22 and 23rd, will be one of the most elaborate affairs connected with mining that has ever been held.

We give below a complete list of all the

Committees and those composing them. In our issue of November 15th, we gave the basis of representation, and wish to impress upon the mind of those interested the necessity of lending what aid is possible to make this convention a grander success than anything held heretofore.

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TRANSVAAL GOLD PRODUCTION.

History will be made rapidly in South Africa in the next few weeks, and it is reasonable to consider the immediate and the ultimate effect of the impending changes upon the gold output of the region. In the first place, it seems already clear that the great mining properties there will be protected, and even that production will go on as usual in many places. Two powerful forces are at work to prevent the destruction of the mines—first, the fact that the Transvaal Treasury will naturally need all the money it can get to carry on the war, and can most conveniently obtain funds by working the mines and "commandeering" the product; and, second, the fact that the Rand Mines are largely owned, not in England alone, but also on the Continent. A protective police force has already been organized in Johannesburg to guard the mines.

While, therefore, the machinery of gold production will be maintained intact and uninjured in all likelihood, it is also true that Europe must get along for a longer or shorter period without the liberal addition to its gold supply hitherto received from the rich reefs of South Africa. The stoppage is a serious matter, and must be taken into account by the European houses, as the output of the Rand had reached at the outbreak of the war the enormous total of nine millions of dollars a month.

As for the ultimate effects of the war, no one can doubt that the operation of the mines under the protection of the English rule will be greatly facilitated and energized. Freedom from the numerous restrictions heretofore imposed upon the miners will tend to increase production, and especially will this result follow from the overwhelming influx of capital certain to occur as soon as peace is assured. So recently as 1891 the Transvaal gold product was only about twelve and one-half million dollars, as compared with seventy-three and one-half millions in 1898; but the figures for the next decade, under the new conditions, are likely to be even more surprising.

A NEW SOLAR ATTACHMENT.

C. L. Berger & Sons' Solar Attachment, recently designed and patented by the firm, illustrated herewith, consists of an equatorial adapter, an auxiliary telescope, and a striding level.

The equatorial adapter made to fit to the upright part on certain of their mining transits, where the auxiliary telescope ordinarily goes, receives the auxiliary telescope and converts it into a solar telescope, permitting it to move in the equatorial circle about a polar axis and in the declination circle of the sun. The adapter consists of two plates provided with leveling screws working against opposing springs which permit the polar axis to be adjusted to the zenith when the main telescope is level and consequently to point to the pole when the main telescope is elevated in the plane of the meridian to intersect the equatorial circle. The lower plate of the adapter screws upon the central vertical part of one mining transit which was originally designed to carry the auxiliary telescope when used as a top telescope.

The upper plate of the adapter carries a small level and the polar axis around which moves the socket carrying an arm in which the declination axis can be made to revolve. The declination axis has at one end a threaded stud similar to those provided for the auxiliary telescope when used as a side or top telescope, and to which the auxiliary telescope can be screwed. To do this it is only necessary to slightly release the innermost nut from its fastenings against the upright and then by turning the declination axis by means of the outer milled headed screw, the auxiliary, now solar, telescope can be securely fastened thereto. The polar axis socket and the upper part of the adapter carries a small level by which the adapter can be adjusted in relation to the transit proper, so that the polar axis will point to the zenith when the main telescope is level. To use the solar attachment screw the equatorial adapter for the central part: level up the transit by means of the plate levels and assuming that all the adjustments of the transit and those of its motion in vertical plane have previously been verified, attach the auxiliary or solar telescope to its part by slightly unloosening the milled headed nut next to the upright carrying the declination axis; then by turning the other milled head firmly fastening the auxiliary telescope to the declination axis. Bring the main telescope level to the width of its tube, where the zero of its vertical circle showed coincidence with the zero of the vernier. Level up the equatorial adapter by revolving it, by means of its level and the two milled headed screws acting against its opposing springs in the lower plate provided for that purpose. This is necessary in order to make the polar axis truly at right angles to the line of collimation of the main telescope. This adjustment once properly made need only be repeated for verification of adjustment from time to time as deemed neces-

sary. Set off on the vertical circle the declination and refraction of the day and hour of observation; clamp the declination axis tightly to the upright carrying the declination axis by means of the inner milled headed nut, previously taking care that the stud between the two opposing screws shall be nearly in the center when the telescope is nearly in a horizontal position. Place the striding level upon the auxiliary telescope and by means of the two opposing screws place the bubble in the center of its tube.

The two telescopes now occupy a position with each other equal to the declination and

allel thereto, so made to distinguish them from the wires marking the line of collimation of the telescope and thus to avoid mistakes on the part of the observer.

The striding level will prove a valuable adjunct for the setting of the auxiliary telescope when used as a side telescope to read the same level line as the main telescope.

The equatorial adapter being in part made of aluminum and of brass, weight only nine ounces, the same counterpoise used for the auxiliary telescope may also be used for the equatorial adapter by the exercise of proper care. The observations with this solar attachment are exceedingly simple to make. The equatorial adapter raising the auxiliary telescope considerably above the vertical circle, observation can frequently be made if desired without the use of a prism by simply screwing the colored glass furnished with the instrument upon the eyepiece. The observer should set the tripod firmly, giving the legs an unusually wide spread.

Receiver Asked for United Verde.

Henry G. Atwater, of the law firm of Atwater & Cruikshank, said Nov. 28, that a suit had been brought in the State Supreme court for the appointment of a receiver for the United Verde Copper Company at Jerome, Arizona, and the railroad leading to Jerome Junction from the works. United States Senator William A. Clark is one of the largest stockholders in the company, which is capitalized for \$3,000,000.

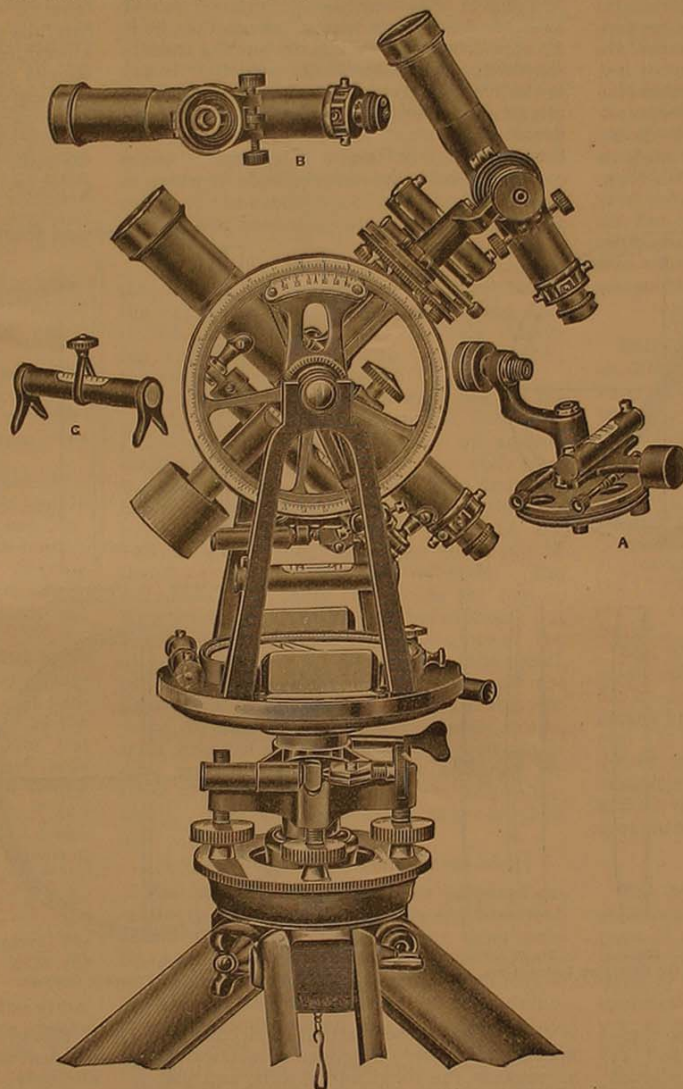
Mr. Atwater said that the suit was brought for the purpose of preventing the sale of the property with a view to reorganization of the company. The minor stockholder, who are interested in the proceedings, fear that they are to be frozen out in the reorganization and have taken this means to block the deal. The company was organized under the laws of the state of New York in 1883, but as the laws governing corporations became more severe, it was advisable to give up the New York charter. Out of 300,000 shares the holders of 299,000 voted to dissolve the company as a New York corporation. To this end the property will be sold, but will be bought in by the majority stockholders.

The purpose is to organize a new corporation under the laws of West Virginia, with a capital of \$3,000,000, and to transfer all the property in exchange for stocks and

bonds, which will be divided among the present stockholders pro rata.

The new suit to turn the property over to a receiver threatens to upset the reorganization scheme and involve the property in long litigation. The mine is one of the largest producers of copper in the United States.

Rich deposits of tin have been discovered in Queensland, Australia. Developments by hand labor make it almost a matter of absolute certainty that the lead struck extends for some miles, and that where it breaks off, isolated masses of ore are in fair abundance.



A.—SOLAR EQUATORIAL ADAPTER. B.—INTERCHANGEABLE AUXILIARY TELESCOPE. C.—STRIDING LEVEL.

refraction of the day and hour of observation. Set the vertical circle to correspond to the colatitude of the place of observation and the solar telescope is ready for work. The striding level should be taken over before the solar attachment is set for colatitude and the two telescopes should be placed in the same vertical plane by bisecting with both telescopes some distant object. The cross-wire arrangement in the auxiliary telescope is a square somewhat smaller than the disk of the one which is illustrated in diaphragm No. 2 on page 81 of this firm's catalogue. The coarse wires of the square are equi-distant from the horizontal and vertical central wires and par-

DIFFERENCE IN MAGNETIC NEEDLES.

BY C. LOUIS BERGER.

Why do different magnetic needles not always point in the same direction, though observed at the same place and time?

A close observer of the compasses used in surveying instruments must have noticed that the exterior shape of the magnetic needles, forming part thereof, frequently differs as much as do the styles of the instruments themselves. In some cases the needle consists of a bar of thin steel, oblong in shape, which rests flatwise on its supporting pin, so that its greatest superficial area lies in the horizontal plane as shown in Fig. 1. In others, as represented in Figs. 2, 3 and 4, the shapes are modifications of the above in a greater or less degree, inasmuch as their longer transverse dimensions—whether at the ends or center—also lie in the horizontal direction. Some magnetic needles carry a graduated circle or verniers, as the case may be, as seen in Figs.

5 and 6, whose zero points are supposed to lie in the geometrical axis of the needle; some are placed edgewise, so that the greatest superficial area lies in the vertical plane. There are also dipping needles to measure the intensity of the earth's magnetism; short and stubby needles with aluminum extensions for galvanometers; complex needles, made in sections, used in marine compasses, and cylindrical or tubular forms used in scientific research. (Needles of the last mentioned type are not read by observing the ends, but by means of mirrors attached at the middle similar to those on a magnetometer.) Figs. 9, 10 and 11 show the principal types of the last mentioned needles.*

Since these latter forms are never met with in surveying instruments, we shall not consider them here, except to show the different styles of needles in vogue—suffice it to say that some of the shapes are simply selected by their propounders for the larger superficial area which they have, compared with others, according to the purposes for which they are intended; for it is well known that the larger

the superficial area, combined with a minimum weight, the more delicate will the magnetic needle be; thus, a needle made of very thin steel tube will be capable of receiving and retaining a greater charge of magnetic force, and also being very light—preventing wear of the cap and pin—it is easily influenced to assume the direction of the magnetic meridian in azimuth.

However, we wish to remark here that it is not so important that the needle of a surveying instrument should have a great magnetic intensity up or nearly to saturation—which it may receive according to its superficial area and degree of hardness—as it is that it should have as constant an amount as possible, be it great or small. Of course such a needle should not have a surcharge, which it is apt to receive if improperly hardened, because its intensity is liable to be diminished and the needle thrown out of balance thereby, from time to time requiring a readjustment of its counterpoise for the same latitude in which it

remains therefore, for us to show in how far the exterior shape of a needle—whether of a faulty design or imperfect construction—may affect its reading, inasmuch as its geometrical axis, that is, the line passing through its ends and the center point in the needle cap may not coincide with its magnetic axis, which lies in the plane passing vertically through its poles and in which the magnetic meridian is contained.

However, to get a complete understanding of the matter, we must go back to the ingot from which the steel of the needle was produced. If we remove a portion of the outer crust of a steel ingot or other casting and carefully examine the surface laid bare with a magnifying glass, we shall find that what seemed to the naked eye as a solid mass is now a spongy one, with numberless small and large cavities or blow holes. It is only by forging and rolling into bars and sheets, at the mill, that the metal becomes at all homogeneous. Some of the cavities not being

welded, are elongated in the direction of the rolling, and form veins, flaws or blisters according to size, thus imparting to the bar or the a structural grain or fibre, which, while always traceable in poor steel, can only be detected in degree when the ingot has been converted into fine steel. In the absence of information to the contrary it is therefore but natural for the writer to believe that when a needle is being magnetized its resulting magnetic axis will in all likelihood tend to run in the direction of the general trend

of this grain without strict regard to the geometrical axis, with which it may then be at an angle. The above divergence of these two axes may, therefore, be considered as one cause of the observed fact—that two needles, though of the same size and shape, other things being equal, may not read exactly the same when observed at the same place and time.

If, on the other hand, these two axes (magnetic and geometrical) do coincide, there will be no deviation, and two or any number of needles will read alike under the conditions above mentioned, if tested in the same compass.

Notwithstanding the fact that it is, in practice, very difficult to attain the desired result, on account of the difficulty of tracing the grain, the writer would and does insist that the steel used in the construction of needles for surveying instruments shall not be forged, but shall be cut from fine shear steel, in the

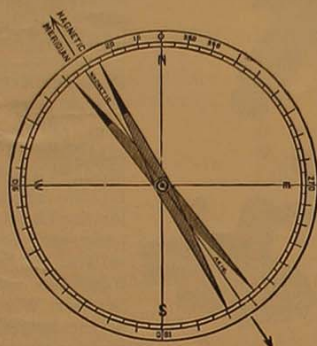
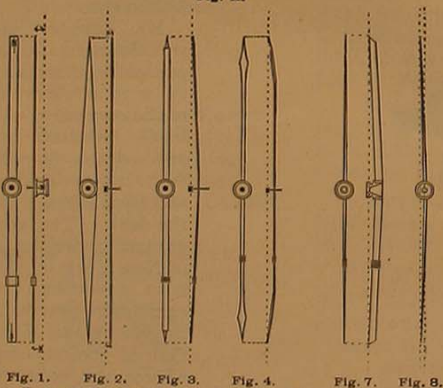
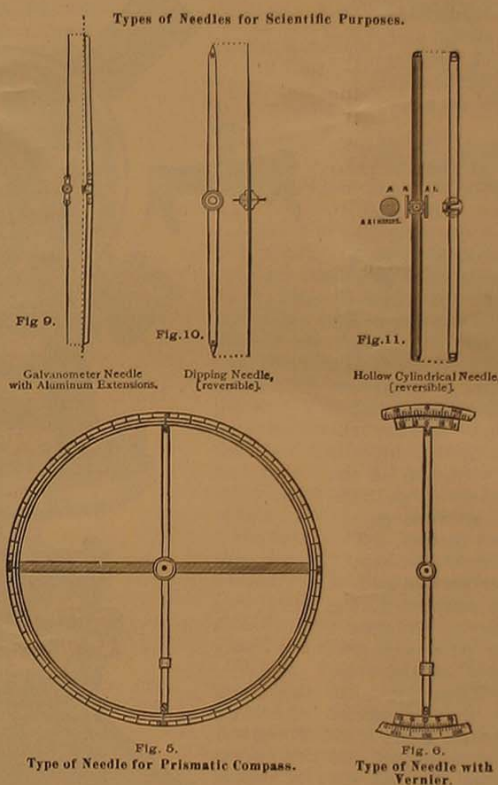


Fig. A.



Types of Magnetic Needles for Surveying Instruments.



Type of Needle for Prismatic Compasses.

Type of Needle with Vernier.

is used. It is all-essential that a well constituted needle should have a proper symmetrical form as regards the longitudinal axis, and that it should be supported on a pivot as free from friction as it is possible for human ingenuity and skill to contrive. Besides the necessity of proper form and suspension, the quality and degree of hardness of the steel, length of the needle, and lastly the strength of its magnetic force, whether imparted by an auxiliary magnet or more powerful electric battery and coil, have a most important influence on the behavior of a needle.

Returning to Fig. 1 we see exemplified the flat bar, and in Fig. 7 the edge bar needle as used in surveyors' compasses, but as all the intermediate styles of needles are simply modifications of the flat oblong form in order to be light in weight, partaking of the same principle that is involved, we shall consider these two forms almost exclusively. It

*The largest and most delicate magnetic needle with which the writer is acquainted is that of the large magnetometer in the University of Marburg, made of a solid bar of steel two feet long and weighing about twenty-five pounds. It was suspended from the ceiling by a strand of silk fibres, and was provided with mirrors so that any oscillation could easily be read by the use of a scale and theodolite. This instrument was made after the style of the Gauss' instrument, and with it many observations were made to determine the diurnal and annual changes in the magnetic meridian at that place during the younger days of the writer.

direction in which it was rolled, and be treated in such a manner as to ensure as near a parallelism of the structural grain with the geometrical axis as possible. Yet in spite of the utmost care and skill consequent minor magnetic poles are probably present, and there is almost certain to be a deviation of these two axes, and this deviation will vary in magnitude with the quality of the material and the grain, the design, width and length of the needle, and the mechanical skill with which its outlines in azimuth have been made, as also with the degree of accuracy with which the point of suspension has been located in the geometrical axis.

While it may seem that just here the instrument maker's real work should begin in the testing and adjusting of these axes by grinding off a little from one side or the other, as the case may be, to insure a coincidence of the two axes, he, as a rule, will stop here, either from lack of understanding or from want of necessary apparatus and a secluded space free from iron and provided with well defined meridian marks established by means of collimators or natural objects.

His chief reason for not doing this, however, may be said to be the fact that neither he nor the surveyor wish to bear the added expense.

For this and other reasons the scientist, not wishing to depend upon mechanical skill for good results, adopts the method of reversion, by means of which errors from this source can be entirely eliminated.

Therefore, the needle used in his investigations (See Fig. A) can be reversed by simply turning the needle upside down (the cap having been changed from the top to the bottom side of the needle) on the center bearing point, so that he can use the mean of the readings of each end in both the direct and reverse position as the result sought.

If the surveyor is desirous of making some such test, he can do so readily, not by changing the center cap as above noted, for he cannot do so with American instruments, as the center cap is firmly fixed to the needle, but by first taking a careful reading of both ends of the needle, he can, by means of a strong magnet reverse the poles of the needle,* and after rebalancing, read again the two ends, thus obtaining a reading correct in a measure, and approximately finding the constant of his needle, which he can use when needed for important work.

The constant of the needle is, therefore, the angle that the magnetic axis makes with the geometrical axis.

If a needle has aluminum extension arms, as in galvanometers Fig. 9, or a circle attached as in the case of prismatic compasses, Fig. 5, or if it is provided with verniers as in some compasses, Fig. 6, then the constant of the needle or the index error is the angle that the zeros of the graduations or extensions (supposed to be in coincidence with the geometric axis) makes with the magnetic axis. As a rule, needles of the latter type always do have such an index error in addition to those arising from eccentricity of graduation and the difficulty encountered by the maker to determine the magnetic axis.

While the methods of reversion for eliminating errors of eccentricity and non-coincidence of the principal axes just described are good for scientific research, they are ill adapted for the work of the surveyor.

(To be Continued)

*Accidental charging of the poles by carrying the instrument on an electric car near the motor has been noticed by the writer, and has explained what, at first, seemed to be very queer behavior on the part of the needle.

COLD EXPANSION OF METALS.*

A California Engineer's Remarkable Observations in Siberia.

The singular metallic phenomenon observed by Lodian on the great Siberian railroad—Steel rails expanding under intense cold.

By L. LODIAN, C. E., SAN FRANCISCO.

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In the private report on the Lodian inspection of the military and strategic features of the great trans-Ciberian & Russian railroad systems (*Report secret de l'inspection Lodian des fautes militaires & strategiques du chemin-de-fer trans-Ciberian & des roies-farrees russes—1896-97-98* [Paris; 1898]), there are naturally many notes which merit being saved from the oblivion of official & state archives & cabinet pigeon-holes—particularly as no copies of the report were issued to the public, nor are any now obtainable either officially or privately.

One of the most curious observations therein is in reality a phenomenon & relates to the expansion of steel rails under long-continued, excessive dry cold. Entirely rewriting and developing this particular exhibit, the following has to be said.

Frequently during the intense cold of the months of December, January, and February, I observed the rails so jammed up against each other by expansion, that the ends were beginning to work up, but were kept down by being jammed down by the passing cars. For length after length, versta after versta, the expansion was such that a pin could not be thrust anywhere between the rail-ends. The rails were light—only 18 pounds per foot—, Russian-made (according to inscription); but I never troubled at the time to inquire of the division-engineers for an analysis of the metal, or for samples,—altho just here I know the data would be interesting. Now, at this distance, to even get a 'pocket' sample would, with express charges, cost \$50,—so costly does any special requirement suddenly become so soon as it touches "une affaire foraine". Most engineers know this—to their cost.

[a contribution to science, & its labor]

The present paper has been prepared exclusively for publication, & has not been read before any society, or given any prior publicity which might detract from its value as an original contribution. To give an idea of the amount of time involved in the production of a studied paper like this, I may state that the work on it has lasted from the winter of '96-97,—since I have only been able to touch it at intervals as time and inclination permitted. The first ruf notes were made on the spot in Cibiria: for I decided there and then to communicate the phenomenon some day to science in a special paper distinct from my private reports (which, by the way, never see the light of print).

Working on the paper thus piecemeal,—the typewritten copy appearing on different-size slips,—as happened handiest,—will explain the rather disconnected nature of the paragraphs—which, however, for easier reference, have mostly been placed under small-capital cross-heads.

*While Mr. Lodian is an American born citizen, he has spent most of his time in France and the frozen lands of Russian-Siberia.

The notes herewith are printed as they appeared in his copy, not having been edited, or changed in any way, except where reference was made to politics, which was omitted, as it did not have any bearing on the subject.—ASSOCIATE EDITOR.

[the name Cibiria]

Thruout this paper, I have spelt Cibiria the only correct way, which is the Russian way (Cibipia, pronounced Cibiria; formerly Cibip, pron. Cibir). All other ways are wrong. The improper "Siberia" is a copy of the French ignorant corruption "Siberie". The gaulois corrupt everything from names to jews I kno it requires an enormous amount of moral courage to spel a word properly. The original call for the Lodian controlling inspection, stipulated for the conservation of the strict purity of geographic names as locally spelt. In this respect alone, the report ranks as a model of geographic accuracy.

[negociatory]

It is true—I might as well at once say—that during the moderat—for Cibiria—cold, say down to 25—40 below zero centigrado (at 40° below, centigrado and fahrenheit are just equal), the usual rail-contractions were noticed here as in any other country during winter, but of course being far more pronounced in this sub-arctic region. I have sometimes seen such a contraction as to leave 2½ centimeters between rail-ends—almost an inch.

[the cold-expansion phenomenon]

But, beyond 40 below zero, under certain conditions, steel rails begin to behave differently. They expand! The fact is incontrovertible,—since various Russian engineers in Cibiria, placed in possession of the singular feature by myself, have taken cognizance of it; but for any of them to report the matter to headquarters at Peterburg would be considered an "act of presumption", because "unknown to science"; and might lead to the engineer reporting, being still further sent the Ciprian way—I mean the Cibirian way,—, so the engineers diplomatically "hold their tungs".

Just why this expansion occurs under excessive cold-spells—for there must be a reason for it—is one of those problems which by no means known to me can be explained at present. It is a problem which means and requires, to be answered thoroly, an efficient laboratory and costly instruments of precision and diverse machinery, for observation on the spot thru several successiv winter-months.

[deduction]

The deduction to be derived from the above observations is this: That certain compositions of iron and steel act, under protracted intense cold the same as water acts. The particles or molecules of water, as is well known, contract down to zero; then beyond that, begin to expand, and, in the form of ice, to float. Certain metals contract, I should say, down to 35 below zero centigrado,—varying according to the constitution of the molecules—; then under a long succession of intensely cold dry days at from 35 to 50 below, to expand in almost the same ratio as during summer weather at from 30 to 40 degrees centigrado above.

[“theory” versus practice]

But diploma-theorists and college-professors can argue as they like as to whether steel rails expand under abnormal conditions of natural cold. I would advise the more skeptical of them to take a little walk of, say, 2000 miles over the great Cibirian railroad during December, January and February to find out for themselves. They could then make cool calculations ad libitum!

As a practician myself, I never had much respect for "theorists". It was "theorists"

—engineering" and otherwise—who declared Suez canal could never be built; that a steamer could never cross the ocean; that a trans-American railroad was "impossible" (there are 7 in operation today); while other notorious "impossibilities"—to "theorists"—might be quoted ad nauseum.

"Practice disposes what theory proposes" is simply another rendering of an old proverb—Theory proposes; Practice disposes. 'All things are right'—or wrong—in theory. The proverbial '99' turn out wrong in practice. But it is just on the odd 1 per cent that theorists get left.

This phenomenon will be doubted, I know—like a good many other things I have to say about Ciberia (improperly "Siberia") and its climate. But, then—I saw the singularity again & again, over thousands of miles, with my own eyes, and I believe I am the first person to notice this peculiar behavior of steel rails, and am glad to contribute the item to the history of metals. Even Russian engineers themselves—of the very divisions on the central Ciberian and western Ciberian stretches where the expansions were most marked—were unaware of this fact until I took them the news. And I can easily understand why they had never found it out for themselves,—for during my thru-winter 3000-mile survey of the Ciberian railroad—constructed and constructing—(Oct. '86–April '97) over the snow-ice from the Baikal and Altai regions to the Ural mountains, I never once met a single engineer out inspecting the line. It was too cool for them!

[the greatest long-distance survey on record]

Since the subject is interesting, a brief sketch of the remarkable survey during which phenomena were observed,—of which this cold-expansion theory is but one,—will probably be appreciated. It will prove at least that the suggested new 'lex Lodian' in metalics has been based upon the most prolonged personal observations on the spot.

The trans-Ciberian trans-European inspection and survey of the Lodian commission was privately commenced at Bladiboctok (pronounced Vladifoctok—c soft), on the Pacific ocean (nacifik-ocean), the 18 (30) April '96; proceeded north to Kabapovck (pron. Kabarovck) on the Amur; then skirted the Amur & connexions, along the Manchuria frontier; for 2000 verstas; crossed the Iabloni range on the confines of eastern Ciberia; the trans-Baikal region; the Altai ciepa (pron. ciera),—the ciera-nevada of central Ciberia and Mongolia—; covered the circum-Baikal strategic route; and gained Ipytck (pron. Irkutck.—c always soft) the 20 August (1 Sept.).

Two months' delay occurred at this dirty big village in the heart of Ciberia, (styled the 'capital' thereof), awaiting instructions; and the 16 (25) Oct. the unique thru-winter surveying detail was commenced. (The winter had set in nearly a month previous.) It is believed to be the first and only instance on record in the history of surveying of a topographic detail planned on an all-winter 3000-mile scale of magnitude over the Ciberian snows.

[where the cold-expansion discovery was made]

From Ipytck, the line of operations of the Lodian detail lay over the central Ciberian ciepa; deviated thru the Tomck region,—surveying (January '97) thru 52° below centigrado (58° below f.), the maximum cold recorded during the circuitous 8000-mile overland survey between the Pacific ocean & Polska (Poland). Followed the tryingly-

severe surveys thru the icy-blasts of the great Kirgisi 2000-verstas-across cten (pron. step) of Western Ciberia; and finally the historic Acia-Ebpona (Asia-Europa) monument in the heart of the Urals was passed on the central route beyond Cipocetari (pron. Ciroctan) the 18 (30) April '97.

This ended the trans-Asiatic detail.

[strategising Russian railroads]

Here, the trans-European survey was commenced, & continued over the Ural divide circuitously across Pocia (Russia), via Camapa (pron. Camara) and Tyla—near which town occurred the pre-arranged Tolstoi-Lodian meeting,—perhaps the most *distingue'* European-American individual meeting since the Kossuth-Lodian conference at Torino in June '92.

Now the tangent-surveys went north to Mockna (pron. Mockfa), where arrangements were made for a second thru-winter surveying campaign thru northern Russia. This was duly effected to the capital, Petersburg; thence south-west via Dbinck (pron. Dfinck) to Warszawa; and from the Polska capital to the old Polish town of Posnan, where the surveys were definitely concluded the 22nd Feb. (16 March) '98,—the self-same original Lodian trans-Asiatic trans-European survey going out of commission here.

Official report: no incident (the entire thru-route and strategic inspection being accomplished without hindrance or a single mishap.)

Total distance inspected and surveyed, including detours, 12,900 bepctac (pronounced verstas), or exceeding 1300 decimal leags (1 decimal leag = $6\frac{1}{4}$ miles), or over 8,000 miles. Time: 676 days,—thru two summers & two winters,—of which 266 interspersed "in" days,—(noting, resting, off-visits, &c.)

[8000 miles of tangent-surveying afoot]

As the detailed nature of this now historic survey and inspection called for constant traveling afoot, it is calculated that—on and off—fully 8000 miles were covered on foot,—an average for the whole period on commission, turning a dozen miles per diem, or say half a mile an hour all thru,—an apparently most insignificant 'speed'.

But of course the most remarkable thing about the leisurely-accomplished Lodian tangent survey was its 8000-mile magnitude, of which 4000 miles afoot over the winter snows alone at Ciberia and Russia.

[abnormal cold-expansion on the trans-Baikal]

This expansion of rails under protracted cold weather may prove a source of danger on the Baikal and trans Baikal stretches, where the cold is intenser and dryer and lasts longer than in Western Ciberia. But I cannot write with the same precision on the trans-Baikal lines as I do on the central & western Ciberian sections, since all the trans-Baikal and Pacific-ocean divisions of the constructing railroad comprised in the Lodian inspection, were examined during the spring & summer of '96, including the trans-Altai circum-Baikal strategic routes.

[cold-expansion derailment a possibility]

It may result that the Russian engineers will one day discover they have neglected to reckon with this glacial rail-expansion. Simply because, like other engineers, they are mostly ignorant of this minor phenomenon. For a thousand miles on the Altai side of the Baikal, the intense cold is almost continuous night & day for four or five months. This may, during the glacial spells of January & February, be enuf to at times send the rails

on the creep to a dangerous extent. There may be repeated derailments during the arctic season, & it will puzzle the division-engineers—ignorant of the cause—to account for them. And, the engineer's house being maybe 70 to 100 verstas from the spot, and not caring himself to face the glacial blasts on *drizina* (inspection trolley) or afoot to make a minute inspection, he is not likely to easily find out. Then a special, gorgeously-uniformed commission, with little toy swords, will be sent from Petersburg 4000 miles to investigate. This will cost about 10,000 pycle (pronounced rubls).

[cold-expansion, like heat-expansion, not consistent]

The cold-expansions were not consistent, however, as noted during daily observations extending across 4000 verstas of territory under the snow-ice. In many widely-separated localities, some rails apparently showed neither contraction or expansion from the normal under 40°–50° below centigrado; and I concluded these had already undergone contraction then had expanded to the limit permitted by the constitution of the molecules, which lent the rails an apparently normal appearance—as I saw them. How otherwise could their seemingly normal status be accounted for in 40°–52° below zero centigrado (40°–58° fahr.)?

[comparing notes]

Should any reader of these remarks have noticed or heard of similar phenomena, I should be glad to compare notes. While I am traveling just now, I have permanent addresses at San-Francisco (Kalifornia), & in Europe at Paris (avenue de l'opera 21). My present traveling postal address is 12 g. d., Manhatn, New-York.

[natural cold & artificial cold: the difference]

Now, to anticipate having the "liquid air" argument brought into play, as antagonistic to this cold-expansion idea, permit me to point out the difference between artificial liquid air cold and the natural desicated Ciberian winter. Liquid air means moisture,—air liquified by *artificial* cold. Where moisture is present, there will never be any cold-expansion,—might just as well expect certain fuses of electricity out of damp. Nor—being an artificial cold—would liquid-air cold avail for the experimental production of cold-expansion.

[cause & effect: an idea of the Ciberian cold that causes the expansion]

The extreme purity of the winter air in Ciberia will one day render it famous as a health resort. (The Russian government have for many years recognised its efficiency as a health resort—for political patients.) The Ciberian winter cold is of a dryness incomparable. Even the latent "moisture"—or whatever it can be termed—in the air during the superb sunny days of midwinter, is only manifest by its being seen floating in the air, during the days of intensest cold, in the form of minutest ice-crystals. By latent moisture, I mean a moisture so imperceptible, that no instrument of precision known to science is capable of registering it. Nature's unique cold here freezes everything—even unto the latent moisture; and under these circumstances, certain compositions of metals will expand.

[lex Lodian (law Lodian).—Shall it be called the Lodian law?]

To prevent misrepresentation by technical—and other dictionary—compilers, I will sin-

opside the whole matter under the caption 'law Lodian',—since I am, I believe, the first person to notice the phenomenon—; and respectfully submit the proposition to the scientific societies of the globe for investigation:

Lodian law, in *metals*, the law (the subject of current inquiry) that certain compositions of metals are liable to expansion under prolonged periods of intense, dry, natural cold, from 35°—50° below centigrado. [First noted by L. Lodian, an American engineer, during the Lodian thru-inspection of the great trans-Cibirian railroad, winter '96-'97]

[summing-up]

To sum up, I can only confirm my previous opinion—

1st—That iron and steel of certain compositions are liable to expansion under conditions of protracted intense dry cold.

2nd—The local causes are open for complete investigation—which investigation, however, is never likely to be made, since it would cost some five thousand dollars to depute a properly-equipped specialist to the spot to watch the phenomena thru a Cibirian winter.

San Francisco.

L. LODIAN.

MINERAL RESOURCES OF SIBERIA.*

(BY N. J. STONE.)

Siberia's mineral wealth is a matter of great importance. The well known French economist, M. Leroy Beaulieu, in concluding his letters from Siberia, a few months ago, expressed the opinion that Siberia is not ripe for developing manufactures, but needs only foreign capital and foreign skill to bring out the enormous mineral wealth that lies hidden in its bowels. And here he struck the keynote of the situation. Let us try to get a glimpse of Siberia as she appears to the eye of the geographer and mineralogist, before we draw our own conclusions.

According to Russian geographies, Siberia may be divided into three principal zones:

- (1.) The agricultural zone.
- (2.) The forest zone.
- (3.) Polar, or northern zone.

The following brief table, taken from the Statistical Almanac, *The Whole Russia*, gives an idea of their relative importance:

ZONE.	AREA, SQUARE MILES.	PER CENT.	POPULATION.
Agricultural,	1,366,151	25	5,500,000
Forest.....	2,326,539	43	845,000
Polar.....	1,728,896	32	75,000
Total.....	5,421,586	100	6,420,000

What makes a particularly cold country less adapted for agriculture than regions of European Russia, situated at a corresponding latitude, is the conformation of its surface. A vast endless plain, with the highest mountains in the world situated at its southern borders, and thus effectually cutting her off from the influence of the milder climate of the south, she lies open to the northern winds of the Arctic Ocean.

The figures given above for the area of the agricultural zone, (which is more than twice that given by Dr. Ballou) are based on the assumption that the lowest average yearly temperature, compatible with agriculture, is slightly above 57° F. If we were to draw a line on a map denoting the limits of that zone, we would get a sloping line beginning at the extreme western end of Siberia, at about 60° north latitude, sloping southward on its way East, cutting through Lake Bai-

kal in its northern part, and coinciding with the parallel 50° north latitude at the extreme east. This zone, in its western part, may be subdivided into two parts, the southern, which is hilly, and the northern, consisting of steppes. The former, protected from the north by a chain of high mountains, has a mild climate, in fact, one of the finest in the Russian Empire, allowing not only of the growing of cereals and vegetables, but even that of fruits, grapes not excepted.

The northern level country is very arid, and, in consequence, suffers from extremes of heat and cold; still, its colds are not as severe as in the rest of Siberia. Besides raising all sorts of cereals, from wheat to oats, it has many other resources for the population to fall back upon. Its fisheries alone might furnish employment to many more thousands of people than they do now, but for lack of capital. The rarest and choicest of fish, such as make up the delicacies of the most exacting gastronomer, are caught here in abundance, and the export trade which has now become so easy, owing to the Trans-Caspian Railway, and which amounts to thousands of pounds* at present, needs yet to be properly organized.

The white steppes of the Semipalatinsk territory, a region only slightly less in area than France, overflow with an abundance of cattle, grazing being the chief occupation of the nomadic tribes wandering here, and offer exceptional opportunities for soap and leather manufacture, which is just now in its infancy. And, though the forest zone justly lays claim to the fame of being the richest part of Siberia, it is by no means the only one that can boast of great mineral wealth. Rich deposits of gold, silver and minerals are found in the various parts of Siberia which make up the agricultural zone. In the territory of Semipalatinsk alone are found thirty gold mines, besides rich deposits of silver, lead, coal and graphite, all of which are now being extracted, and give good profits, in spite of the primitive means employed in the work.

The same may be said of the province of Amoor, where gold mining is assuming the leading place in the industries of that region, both by value of its output and the number of workmen employed. In twenty-three years this region has produced from 1,277,473,772 pounds, or 25,549,475½ tons of gravel washed, 6,040 pounds equal to about 3,520,000 Troy ounces of gold, or say \$70,400,000, an average of \$3,060,869 per year.

Gold is obtained here almost exclusively by placer mining, while the extraction of gold from mineral ore has hardly been begun. The good profits the Amoor fields are yielding are still more surprising when to the primitive methods of working are added comparatively high wages, from five or six hundred rubles per year, besides board. (The value of a ruble is equal to 51½ cents; but its purchasing power in Russia is nearly equal to that of a dollar in the United States.) Still the chief occupation in that province is agriculture. Spring corn, wheat, oats, barley and buckwheat are raised; the local product is, however, insufficient for the needs of the population, and grain has to be imported to a considerable extent.

The mountainous part of the government of Tomsk is one of the richest in the empire in mineral wealth. Mining was started here as early as 1726, by the famous Prince Demidoff. The best paying mines are those extracting gold, silver, lead and iron, the latter

especially in the Altai and Salair Mountains. The Altai Mountains are rich in quarries of stone. In the District of Biysk more than five hundred different kinds of colored stone are obtained, besides a great variety of building material, such as granite, porphyry, sandstone, limestone, and also salt. In the district, lying within less than 75 miles from Tomsk, an immense coal field has been lately discovered, which, it is asserted, will furnish a product exceeding in quality the best English kind. There are even two springs of hot mineral water in that neighborhood. Agriculture furnishes occupation to fifteen thousand men. Fishing also occupies a prominent place.

The forest zone, which contains such a small fraction of the population of Siberia, is in reality the richest and most important part, in fact, the one that is destined to prove the point of attraction for foreign and home capital, and therefore to play that commanding part in economic and political life of a young country which the East has been playing in the United States. Being situated to the north of the agricultural zone, it is remarked for its more severe climate. Its northern limits being where the soil is continually in a frozen state. Thus, in the town of Berezoff, situated in this zone, only the upper layer of the soil is not frozen during the brief summers, but at a depth of 2½ feet, the ground is constantly in a frozen state. This is, however, true only of its northern part; as it approaches the south, conditions change for the better. Though smaller in population, it is greater than the agricultural zone in extent. Its mineral wealth is inexhaustible. Mining has been carried on here for the last two centuries. The metals extracted are chiefly gold, silver, mercury, tin, lead, copper and iron; turf, hard coal, graphite, sulphur and naphtha are also mined, besides two kinds of salt—the ordinary table salt and the medical Glauber's salt.

As we shall see, when reviewing the resources of some of the provinces in that region, rich finds of precious stones are not infrequent. This is perfectly natural when we recall the fact that Siberia was once a tropical country, covered with the richest forests, a country with a nature in no way second to that of Brazil. Finds of skeletons of mastodons and other primitive animals naturally suggest the probable presence of rich coal fields, as well as of precious stones, both of which are now in great evidence. The exploitation of diamond fields may in time become here as important an industry as in Brazil or South Africa.

Passing now to some of the provinces in that zone, we may mention the Transbaikalian Province, with an area exceeding that of France. Here, besides gold, silver, lead, iron, tin and copper mines are also found and obtained mercury and the following precious stones: amethyst, jasper, carnelian, agate, opals, topaz, etc. Besides these, the province is rich in mineral waters, boiling springs being met with in many places. The flora and fauna are very rich and of great variety. In the part of Amoor Province belonging to the forest zone, silver and lead, copper and iron are in abundance. In the tributaries of the Selima River, pearl has been discovered in quantities to promise a new valuable industry. Here, as in the other provinces, are to be found ferruginous springs. The flora is luxuriant and differs from that of Continental Asia. The forests are in many parts impassable, presenting a solid phalanx of century-old cedars, and pines 100 feet high, swarming

*From the Monthly Summary of Commerce and Finance of the United States.

*A pood is equal to 40 pounds avoirdupois.

with animals of the most widely different kinds, from deer to tiger.

The island of Sakhalin is known for the rich coal fields, which are worked at present only under contracts for the government, which uses the coal for its fleet on the Pacific. With the development of commerce, this large island will no doubt become an important factor in the Orient. The same is true of the Peninsula of Kamchatka, which, though situated far to the north, is rich in virgin copper, virgin sulphur, magnetic ore, coal, amber and mica.

And, finally, that dreadful Yakutsk Province, which has so much to offset the disadvantages of its severe colds. This province, twice the size of the countries of France, Austria-Hungary, and Germany combined, equal to eight-tenths the area of European Russia, with a density of population amounting to one person for each 6 1-10th square miles, has no lack of mineral wealth. The Stanovoi Mountains, stretching along its eastern boundary, from south to north contain rich ores of silver and lead. Iron and coal are found throughout the province. But the only industry developed here is that of placer mining, especially along the Lena River, which is rich in gold fields.

MEXICAN ONYX.*

The stone to which the name "Onyx," or, more properly, "Onyx Marble" is applied, differs from the marble of the common type in being a purely chemical deposit, rather than resulting from the metamorphism of calcareous sediments from the floor of caves, or a travertine. All the finer grades of onyx in this country, so far as now known, are travertine, that is to say, spring deposits. They have resulted from the leaching out, by carbonated waters, of the lime constituents of pre-existing rocks, and the subsequent deposition of this lime, as carbonate, upon the surface of the ground, when the water evaporated or lost its excess of carbonic acid.

Found in this way it is not difficult to understand that the beds are far less extensive and regular in their arrangement than are the ordinary stratified limestones and marbles. Spring action is more or less intermittent, and the place of discharge, as well as the character of the deposit, is variable. The latter usually takes the form of a comparatively thin crust, conforming to the contours of the surface on which it lies, though sometimes it is in vein-like and irregular nodular masses. The various layers thicken and thin out irregularly, and are often lenticular in cross sections. Layers of uniformly sound material, of more than 20 inches thickness, are not common. Where two or more layers occur, they are as a rule separated by intervening layers of tufaceous matter, or by foreign debris. Both color and textural qualities of the stone are liable to abrupt changes, and not unfrequently the character of the output are so uncertain that it is impossible to make contracts for blocks of any specified size and color in advance of actual quarrying.

A marked and very beautiful feature of the stone is the fine wavy banding shown upon a cross section, which is of course due to the mode of origin through successive depositions upon the surface. The stone owes its value for decorative purposes to its translucency, fine veination and color. In many instances the original hues have been enhanced by

oxidation, and through the development of reticulating veins of small size, due to incipient fracture into which percolating waters have introduced new coloring solutions or locally oxidized the iron carbonate, which seems to form the chief coloring constituent. Mineralogically, it should be stated, the onyx marbles consist almost exclusively of calcite and not aragonite, as has been commonly supposed. Their average hardness is about 3.5, Dana's scale, which is a trifle greater than that of ordinary calcite, though not harder than many compact marbles.

A workable deposit of this onyx is situated at Meyer's Station, 25 or 30 miles southeast of Prescott, in Arizona. This occurs in a country of crystalline schists and older eruptives, and is well exposed at the stage station on the banks of Big Bug Creek. The stone occurs as a surface deposit, and interbedded with a coarse breccia, formed of schistose and dioritic fragments, embedded in a sandy and calcareous matrix, the entire foundation occupying a series of low hills or rounded knolls, of which an area of 200 acres is estimated to comprise all the quarriable material. At the shallow openings that have been made, the onyx occurs in irregular, somewhat concentric layers, from the fraction of an inch to two feet or more in thickness. These were in a few instances quite uniformly green in color throughout, but as a rule, were traversed parallel with the plane of deposition by wavy bands of color in all shades of amber, white, ochre yellow, brown, and deep ochreous red. The sound layers of stone were as a rule separated from each other by porous cellular layers, so that slabs of large size were obtainable only by cutting parallel with the plane of deposition. The more highly-colored varieties carry, as shown by analysis, some five per cent of carbonate of iron.

So far as has been determined by the surface exposures, there are here three beds of the onyx alternating with the breccia above noted.

Mexican onyx, though closely resembling true onyx, is more of a variety of sulphate of lime, such as crystallized gypsum or alabaster colored by the presence of iron or other metallic substances.

True onyx is a kind of agate, or properly classed under the chalcedonic varieties of silica, and is used in making jewellery. The cameo is onyx. The surface having been engraved through leaving the white under-streak, showing through a back ground of brown or black. Again, the raised portions of the cameo, which stand out in bas-relief, are of another color, composed of the next layer or vein of the stone.

CORRESPONDENCE

ARIZONA.

(From Our Special Correspondent.)

CHLORIDE, Arizona, Dec. 10, 1899.

EDITOR JOURNAL:—Fair weather and big and new outputs of ore from all the mines is causing quite an unprecedented state of activity in all circles in this city and surrounding camps and districts. The largest, richest and most permanent body of ore, however is in the Tennessee Mine, whose large body of ore the past summer and fall created great wonderment, but is now fabulous and phenomenal. The main shaft is down about 400 feet, with ore on all sides, top and bottom.

The mill is putting through 200 tons of ore each day and night, and two cars will not carry the concentrates to market daily. The number of men employed is by great odds larger than ever before, and more machinery is constantly being added to the mill as well as in improvements in buildings, tramways and hoisting apparatus. A. M. Botsford of Los Angeles succeeded E. T. Loy as manager in the Tennessee Mine on the 1st inst., and is now regularly installed in his new work and getting acquainted with its needs and necessities. Mr. Loy has been given entire charge of the Juno Mine and is already directing the work of a new plant of hoisting works. With the Juno, it is believed, Mr. Loy will make of it what he has made of the Tennessee.

Work upon the Schuylkill Mine is to begin immediately, and not only employment to a large number of miners will be given, but a new steam hoist and 100-ton concentrating plant is also at once to be instituted. The Schuylkill lies directly between the Tennessee and Elkhart mines, and is joined at either end by both of them. The mine belongs to F. M. Theis, and is known to contain as large and rich an ore body as either of its annexes, but the long drawback to its working has been caused by a pending suit of something like a quarter of a million dollars. But this being off, Mr. Theis has nothing to do but begin the operation of taking down its great ledges of ore and putting it through the concentrator and sending the residue to market.

The Lucky Boy Mine is shipping three carloads of \$1.50 silver ore a week. The tunnel from which the greater part of the ore is being taken is in eighty feet, and driving straight ahead for the summit of the Cerbat Range. A new tunnel, 300 feet below the present one is being started to cut the ledge under the present one. John Smithline, former owner of the mine, and who sold it for a good round sum of money only a few months ago, is foreman and manager, who is the best man of all others to occupy the position. The new owners are well pleased with the purchase, and have heartily entered into its development and improvements.

The Watchman Bros., Thomas & Peter, leasing on the north end of the Distaff Mine, have struck a good sized body of high grade shipping ore. In the old workings, at the south end of the Distaff, Chas. Sherman is taking out shipments of ore from a larger body.

The Merrimac concentrator will be in place and ready for work by Christmas, and a large amount of ore awaits its completion.

MEXICO.

TEPIC, Nov. 20, '99.

EDITOR JOURNAL: M. B. King, M. E., Consulting Engineer for the Valenciana Silver Mining Co., Catarina Silver Mining Co., La Barga Gold Mining & Milling Co., the San Bartolo Gold Mining Co. of Tepic, left for San Francisco on Nov. 23rd, to arrange for the purchasing of the new machinery to be placed in the mines by these Companies. Mr. King will also place a few mines on the market, either for cash or an interest in them for putting in the necessary machinery to handle the ores. He will form a company to work some very extensive copper properties and a quicksilver mine. The mines in and around Tepic are very active, and a large amount of money is being spent on machinery and development work.

* Extracts of an article in the Mineral Industry, by George P. Merrill, and from other sources.

Miscellaneous Mining News.

ALASKA.

Very little is heard in the railroad passenger offices now about the Klondike. The boom in that direction has faded, and the Cape Nome diggings have taken its place. There is one advantage about the Cape Nome country, aside from the reports of the placer diggings are of greater extent and richer than the Klondike, it is in American territory.

The Great Northern road has just issued an illustrated circular giving information about the Cape Nome country.

ARIZONA.

Wm. T. Smith, the assayer of Los Angeles, reports having received a sample of the ore said to be platinum found near Williams and upon analysis of it could not find a trace of platinum.

The Ray Mine, limited, at Ray, in Pinal County, near Florence, is now employing 400 men in the development of its big copper deposits at that place. It is said the company needed 100 more experienced men. The company has started up its concentrating mill, having a capacity of 250 tons per day and is running full time. The company is preparing to put in about twenty cars of new machinery during December, which includes more mills and other appliances to constitute a complete plant for reducing the ore.

Mr. George P. Blair, general manager of the Mammoth Mine, near Tucson, Arizona, states that it has been definitely decided to install at once an electric power plant on the Aravaipa River fifteen miles from Mammoth. Sufficient power will be developed to run the mill with the additional twenty stamps now being put in, the tramway and the hoists. This will make a wonderful saving in fuel, to say nothing of other expenses. In all probability, with electricity as the power, there will be a saving of over \$50,000 per year in operating expenses. Machinery for the additional stamps is now on the way from Chicago. The foundations to the building are already completed, and the framework will be soon under way. Since it passed into the hands of its present owners, the mine has been a wonderful producer, the mill having been run night and day on the high grade ore. After the capacity of the mill has been increased, and the other improvements contemplated carried out, the property bids fair to be one of the most valuable gold mines in the world.

CALIFORNIA.

BUTTE COUNTY.

Negotiations for the sale of the Cherokee mine have been pending for months until recently, when the negotiations were closed and the mine was sold to a Pittsburg syndicate. The new owners propose to work the mine for all the gold there is in it. An immense plant will be put in. Drifting will be in process. It is said that the first operation will be at the base of Table Mountain, within a short distance of the old Wicks plant.

Lic Elias Galindo expects soon to have his mines in first class shape to commence running the new mill before the next rainy season. These mines are among the richest of the Totepuzo District, also, in the Acute-pulco District.

The San Bartolo Mines will soon start a new tunnel to tap the vein at 800 meters deep. This tunnel will be 296 meters long, of regulation size.

Many denouncements are being daily made near Qxtlan and Pijinto.

Large iron ore deposits were discovered on the Hacienda Havarite, 15 miles from Port San Blas, if the ore will warrant, shipments to San Francisco will soon be made. **TEPIC.**

UTAH.

(From our Special Correspondent.)

SALT LAKE CITY, UTAH, Dec. 9, 1899.

EDITOR JOURNAL:—The mining stock market this week had a more healthy condition, although some of the stocks suffered considerably. The bears have retired in a measure and stocks have shown a more healthy condition. Present indications are that the tide has turned and from this time on the tendency will be upward, and we look for better prices in the near future. It would look as though the time was ripe for purchasers to look carefully into the market.

Ajax, inactive. Alice, quiet. Bullion-Beck—no change in this stock. Chloride Point, quiet. Congor, inactive.

Daly dropped off a little this week. Daly-West did some business this week at better prices. Stock selling at \$12. Dalton & Lark, very quiet, although there has been some high-grade ore marketed this week. Mine is looking splendid. Dexter did some business at advanced prices, although at the close of the week there was a report that a 40c assessment would be levied on the stock. This, however, was not verified. Daisy did a large business again this week at advanced prices. Stock selling above 100c. Enlargement of the mill continues and will be completed in the near future.

Eagle & Blue Bell fell off a little, with very little business done. Four Aces quiet. Geyser-Marion inactive. Galena did a little business at last week's prices. Grand Central advanced a little at the close of the week, with very little business done. The December dividend will undoubtedly be passed. Golden Eagle advanced toward the close of the week. Very little business done.

Horn silver, quiet. Homestake, inactive. Ingot did very little business this week. Joe Bowers did considerable business this week and the stock advanced, but slumped toward the close. A report that the company had settled with the Burnham estate by increasing the capital stock 300,000 shares, making a total of 700,000 shares, giving the Burnham Estate 300,000, caused considerable criticism and the stock dropped off some. Joe Bowers Extension advanced somewhat. Very little stock changed hands.

La Reine made an important strike last week, uncovering some three feet of fine galena ore; reports from the mine today showed a marked increase in the above mentioned vein. Lower Mammoth still continues to decline. Little Pittsburg, quiet. Mammoth rallied this week. Stock sold considerably higher. Very little stock changed hands. Mercur quiet. May Day inactive.

Northern Light did very little business. It

is reported that they are making preparations for a shipment of high grade ore which should have arrived last week. Omaha quiet. Ontario still inactive. Overland seems to be looking well so far. Petro advanced some and did a large amount of business this week. They have made large shipments of high grade ore. Richmond Anaconda inactive.

Sunshine quiet. Swansea was strong this week. Prices advanced somewhat. They doubled their dividend this month, which caused an advance in the price of stock. South Swansea did some business at last week's prices. Sunbeam declined somewhat again this week with very little business done. Sacramento was very strong this week. Good reports have been received from the mine, and I would consider it an excellent purchase at present prices. Silver King steady. Star Consolidated declined again this week, on account of the indebtedness of the mine. There is an effort being made to pay off the indebtedness by private subscription. I have not yet learned what success the company has had in this matter.

Utah quiet. Tesora slumped badly this week. The stock was taken off the Exchange by request of the company. Valeo quiet. Very little business being done in that stock. Yankee Consolidated did a little business at last week's prices. **P. J. CONWAY.**

WASHINGTON.

(From Our Special Correspondent.)

SPOKANE, WASH., Dec. 7, '99.

EDITOR JOURNAL: The Republic ledge, at 60 foot level is fully 40 feet wide. This vein has widened with depth. On the first level it was 10 feet; on the second, 25 feet; on the third, 34 feet, and now is fully 40 feet. The south drift is being worked in direction of the Blaine. The porphyry assays \$40.

The cross cut from the bottom of the 60-foot winze in the Quilp ground at Republic is in 20 feet without encountering a wall. Some large assays have been made, \$212 per ton ore in the main tunnel lead has been struck.

East Kootenay is coming to the front in way of mining development and smelters.

The Bull River Mining Co. have 10 claims that have eight distinct leads running parallel about 500 feet apart. Tunnels one and two are in solid ore. The vein is 27 feet wide. The ore carries copper, lead, silver and gold.

Arrangements are being made for the construction of a silver-lead smelter, at Moyie Lake, to handle the ores of St. Eugene, Lake Shore and other mines. It is calculated that the ores can be treated here at a cost of \$9 per ton and operate at a profit.

The surface assay of gold of the Wild Strawberry, owned by the Chopaca Gold M. & M. Co., on Meyers Creek, was \$3.10, total all values, \$12.98; the last assay from near the bottom of the shaft was \$10.38 in gold, and all values \$15.33.

The Wisconsin Mines are giving encouraging results by development. They are owned and controlled by Spokane capitalists.

The Review, it is believed, will make one of the big mines of Meyers Creek. British Columbia people have secured and are operating this property.

The Poland China is again under bond—to Eastern Canadian people this time. It is not known yet what their plans are, but thorough development is intended.

THOMAS & NEWCOMB.

CALAVERAS COUNTY.

Some rich developments have been made in the Big Bonanza Mine, South of Angels Camp, which have caused the stock to take a jump from 50 cents per share to \$2.50. Sinking is going on and the shaft has reached a depth of 300 feet. At this point some rock was encountered, some of which will go as high as \$1,900 to the ton.

KERN COUNTY.

The Pinmore mine, near Johannesburg, has changed ownership. The mine contains a heavy body of low grade ore. A 10-stamp mill formerly at Garlock is to be transferred to the property and equipped with the latest gold-saving apparatus.

RIVERSIDE COUNTY.

Jacob and Charles Yager and Maximo Lopez have placed on record in Riverside County papers for the United Verde, Scandia, Red Queen and Prince mines, which are situated in the San Juan Mountains. J. B. Cook also scored by recording the Relief No. 2 Mine, which is situated in the Cottonwood District.

SAN DIEGO COUNTY.

A new mining section known as the Vallecitos District, between Ramona and Poway, on the grade leading from Poway into Santa Maria Valley, is attracting attention.

SISKIYOU COUNTY.

The mill at the Mabel mine, between Oak Bar and Scott Bay, started to crush quartz last week, which shows very good prospects. The mine paid handsomely when opened by Dr. Timmons and W. A. Chamberlain, the former owners.

COLORADO.

A mining deal of considerable size and importance was recently closed. The deal included the sale and transfer of two well-located claims in the Cripple Creek District to the Constantine Consolidated Mining Company, which had been incorporated for the purpose of holding and working the same.

The claims in question are the Constantine and Julia E, comprising a little over 10 acres of patented ground and for which a price in the neighborhood of \$100,000 was paid. The deal was promoted by Messrs. J. R. McKinnie, N. S. Gandy and L. R. Ehrich, who completed the purchase of the property and organized the Constantine Company to operate the claims. The deal has been on foot for some time, but it is now finally consummated the papers are signed, the deeds turned over and the company perfected its organization.

The new company is capitalized for 1,500,000 shares at the par value of \$1 per share. Of this amount 400,000 shares have been set aside in the treasury and in addition to this amount of stock the treasury will also contain about \$10,000 in cash. The officers of the company are: L. R. Ehrich, President; J. R. McKinnie, Vice President; N. S. Gandy, Secretary, and George E. Hasey, Treasurer. These gentlemen, with W. C. Stark, compose the directorate.

LAKE COUNTY.

The Moyer zinc mill, with a capacity of 100 tons per day, has been started on ore from the Moyer shaft of the Iron Mining Company. Fourteen tables will concentrate the ore and

produce a high grade of both zinc and lead concentrates. It is expected that the zinc product will run about 45 per cent. metallic zinc.

The A. Y. and Minnie is reaching a high average in its daily shipments. The October product was 600 tons of smelting ore and 600 tons of concentrates that yielded 25 to 30 per cent. lead. Development is kept constantly in advance of production, and large ore bodies are being opened up which guarantee a long life to the present workings.

The Chippewa lease recently started by R. B. and N. M. Estey, is in a fair way of occupying a high place among the Breece Hill gold producers. Two shafts have already been started and a third is soon to be put down. The three shafts will be on the east and west line and will be sunk with a view of catching the Penn and Ballard ore bodies on their southerly extension.

The Yak tunnel is now in 8,200 feet, the breast being in the N. Rollins claim, a few hundred feet from the west end of the Golden Eagle. Fifty men in three shifts are employed and the cost to date has been about \$800,000. It will cut the Breece Hill formations at a depth of 1,100 feet and probably tap the Little Johnny ore bodies at about 1,300 feet from the surface, 600 feet below the present workings. It is not unlikely that the tunnel will be continued on to the Resurrection and other claims on Little Ellen Hill.

The Ruby, on Iron Hill, is steadily pushing the drift to the big ore body left standing on its line by the Colorado No. 2. This ore chute is 18 feet wide, by 14 feet thick, and will net \$7 per ton above smelting charges. Occasionally streaks of ore encountered yield astonishing values in silver and gold.

SUMMIT COUNTY.

The drill to be used by the Oro Grande Mining Company in prospecting its placer ground in the vicinity of Dillon, has arrived, and is being set up by John Osgood, who has had considerable experience in drilling in the oil fields of Pennsylvania. The second drill ordered by the Messrs. George E. West and F. R. Blount is expected to arrive in a few days, and will be used in testing the placer ground owned by them south of Breckenridge.

At the Finding shaft on the "Jones" group on Shock Hill, Superintendent Marvel had everything running smoothly. As soon as the station at 300 feet from the surface and the dump have been excavated, drifting will be done on the large iron sulphide blanket vein which was recently opened in this shaft.

One of the most phenomenal discoveries of copper and silver ever made in Colorado, according to the *Daily Mining Record*, was brought to light on Dry Creek, about four miles from the San Miguel river, near Placerville, San Miguel County, two weeks ago. The first reports were, as frequently happens, greatly exaggerated the claim being advanced that the ore at the surface ran upwards of \$1000 to the ton. Later advices, while modifying these values materially give results of tests which show values that should satisfy any reasonable man, yielding a trace of gold, 122.3 ounces silver and 33 per cent. copper, 122.3 total value being not far from \$158 per ton.

An item of special interest in connection with this find is the fact that the most important discovery was made by James Blake, the man who, about three years ago made the

discovery of rich ore at Saw Pit, in the same county. A number of prospectors had been working to open up the contact veins of that section, but had failed and were about to suspend operations when Mr. Blake, by a bold stroke, solved the problem for them. He drove straight ahead through the sandstone, and by a lucky shot exposed the contact deposit, from which more than \$2,000,000 has since been taken out.

MICHIGAN.

The Quincy Mining Company, near Hancock, Houghton County, is building a new machine shop just below No. 6 shaft. The structure will be 145 by 62 feet in size. The foundation wall is five feet high. On this is a brick wall. The work is being delayed by non arrival of the structural iron work, which was ordered two months ago. It is expected now to have the building under roof by Christmas.

A boiler house for No. 6 shaft is being erected behind the machine shop. Structural iron work for this is also delayed. It will be equipped with four water tube boilers, which will be set up in ten days. The smoke stack will be 100 feet high, and set on a big stone foundation. It will have no guy wires, but will be built up with a brick wall inside.

Efforts are being made in Philadelphia to organize a mining company with a capital of \$2,500,000 to take over the old Delaware Mine, also known at different times as the Lac La Belle, Conglomerate, and last winter as the Pawnee, when a company was partly organized. The property is located well toward Keweenaw Point, and is a very extensive one, having some 22,000 acres on the mineral belt. It possesses three amygdaloid lodes, carrying copper and one conglomerate, supposed to be the same as that operated by the Calumet and Hecla. The property has an equipment costing upward of \$500,000, which has been carefully looked after since the closing of the mine, some ten years ago.

MISSOURI.

Owing to the strike of the miners in the Kansas coal fields, from which comes the entire supply of coal for this district, there is imminent prospect of a coal famine. Only a small fraction of the usual amount is being shipped in and railroads and mining plants are all short. The efforts to replace the striking miners with non-union men from West Virginia has proved abortive. A short time ago the Missouri Pacific road brought in a large number of miners from West Virginia, but they only worked a few days, then joined the union and left the mines idle.

Several of the large producers of high grade ore are negotiating directly with foreign metal manufacturers. The contracts will be made for the entire output of the mines in the pool for six months, and it is said that the price offered is nearly as good as the domestic smelters are paying and fully as good as they are likely to pay in the near future.

MONTANA.

Libby Notes.

The concentrator on the Buzz Saw Mine has started up and is now running on about 70 tons of ore a day. The capacity of the plant is 150 tons, but, owing to a defect in

the machinery, the above amount is all that can be put through at the present time.

Information brought down from the West Fisher is to the effect that the 10-stamp mill, which the Fisher Creek Mining Company has been building on the Brick & Brannagan properties in that section the past summer has been completed, and the stamps are now dropping on the ore. Only five stamps were started up at first to test the plant, and it is reported that everything is all right, and that the plant will be run to its full capacity from now on.

William Beager, manager of the American Kootenai Mining Company, has received notice that one carload of machinery left Chicago for this place, and the remainder of the plant will follow in a short time. This machinery is for a 10 stamp mill, which this company will put up on its property on the West Fisher in the spring.

NEVADA.

It is given out that the Young America Mining Company, operating at Tuscaroro, Nevada, has decided to begin at once the erection of a mill on this promising property, the plant to embrace ten stamps to begin with, with room left for additional batteries, the tailings to be handled later on by the application of the cyanide process. Charles Ford, who has had charge of the construction of several Utah mills, will superintend the erection of the new works.

Shields, Morgan and Logan have done a large amount of work the past season on the Wasson, Mt. Grant, Esmeralda Co. A 500-foot tunnel cuts the ledge 300 feet deep. The ledge is about three feet thick, and the ore mills all the way from \$10 to \$50. They have shut down for the winter.

NEW MEXICO.

Hillsboro Notes.

The ore from the Lookout mine, owned by Hon. J. M. Webster and Col. J. P. Parker, of Hillsboro, was assayed this week by Chemist Aloys Preisser and yielded the enormous value of \$55,000 in gold and silver to the ton! This is certainly the richest strike of ore ever made in this section, if not in New Mexico. The treasure was uncovered by Knight & Ricketson, who are operating the property under lease.

This week the Richmond made a twenty-seven ton shipment of \$160 gold and copper ore to the Colorado smelters.

A. Engleman has sold his mine to County Clerk Hall. Consideration \$2,000 cash. Mr. Hall has ordered a gasoline hoist.

The Snake leasers are sacking a forty-three ton shipment of \$220 ore for the Silver City smelter.

Galles & Dissinger have located a seven foot ledge of 28 per cent copper ore in the Cabello mountains.

An \$80 gold nugget was found in the Hillsboro placers this week by Ed. Strickland.

Three tons of gold and copper sulphide ore valued at \$480 per ton was hoisted from No. 2 shaft of the Trippe, last week. The vein at this point is fourteen inches wide.

The Chance mine, of the Sinnamonohoning Co., group, is now hoisting ore valued at \$348 per ton, gold and copper. Manager Brooks will probably have all four mines of

this productive group shipping by March 1st, next. Gravity ore bins will be put in at all of them.

Mr. Bickford, owner of the Johnson, has contracted with Carpenter Nelson for the immediate erection of an ore house of 2,000 tons capacity.

Hon. W. S. Hopewell is erecting a tramway at his Hibernian mine.

The Trippe, Porter and Charter Oak mills are receiving their winter's supply of fuel, and thus giving employment to thirty or more woodhaulers.

A check for \$3,900 was received by the owners of the Odell mine, one day this week, in payment for their last shipment of ore.

By the consolidation of the K. K. and Butler Mining Companies, which occurred this week, the product of these properties is now being mined for \$4 per ton instead of \$7, as formerly.

OREGON.

The Powell Creek Mining Co., have redeeded to Sharp Brothers, Morris & Hosier the Powell creek property at Williams, as the members of the Company could not agree. The former owners still believe the property valuable, but as they were unable themselves to operate it they decided on account of extension of time, etc., and other considerations, to turn the property back to the original owners.

Catharine Creek Mines.

Mr. William James, of La Grande, who owns the controlling interests in the Black Eagle, Golden Crown, Anna J. and Jack's Dream group of mines, located at the head of Catharine Creek, Baker County, has received returns from samples of ore from these mines he had assayed, that shows a most wonderful degree of richness, all the way from \$13 to \$173. Parties who have been investigating the mines make the most flattering reports, and predict they will prove eventually as rich as any that have ever been discovered in the Sumpter, Cornucopia, Cracker Creek, or any other mining district in Eastern Oregon.

SOUTH DAKOTA.

The British-American Gold & Copper Mining Company of Detroit, which is developing a gold property in Butcher Gulch, seven miles east of Deadwood, has put on a night shift and the work will be pushed along more rapidly.

A force of men are constantly employed on the Copper King group, which is under bond and lease to Col. M. H. Day and associates. This is a very promising property, the ore being a carbonate, which assays from 23 to 50 per cent metallic copper, and is located ten miles northwest of Custer in Pennington County.

The Portland Company has just set up an 85-horse power boiler and a new air compressor, on the Greenough ground, at Bald Mountain, which the Portland has under bond. The company is drifting with a view to striking the lower contact on the Portland, at a depth of about 600 feet from the surface, and it was necessary to cross the Greenough claim to reach the desired point with a tunnel, which is now about 1400 feet in length, the air compressor will enable the men to work to better advantage than heretofore.

UTAH.

From Chloride Point Mine at Mercur good reports are received. Shipments of cyanide this week show a marked improvement. They are able to treat the ore at much less expense than formerly, and this leaves a nice profit in the hands of the company after paying all expenses.

The Four Aces Company at Silver City has filed a suit for damages amounting to \$450,000 against the South Swansea Company. The complaint is that they are taking ore from the Four Aces ground.

La Reine Mine at Eureka is improving and the ore body is showing up well. They will be able to make shipments in January.

The Mammoth Co. of Mammoth will probably pay a dividend the first of the year.

A new strike is reported from the Northern Light Mine, and it is understood from the management that the mine is now looking better than it has for some time.

Petro Company of Bingham have discontinued ore shipments for the balance of this year.

At the last meeting of the Star Consolidated Co. of Silver City the stockholders voluntarily agreed to pay an assessment of 10 cents per share. The stock is non-assessable, but this agreement seemed agreeable to nearly all of the stockholders, so it is presumed the indebtedness will now be liquidated. The report was that the mine was in excellent condition.

The Sacramento Mine at Mercur is looking well and dividends are expected before the close of the year.

WASHINGTON.

The Republic Reduction Works is receiving machinery ordered some time ago. They expect to be in operation about February 1st. It will have a capacity of 74 tons a day and will do custom work. This will enable the mines in that camp to market their ore and avoid shipping for long distances. Thirteen men are employed on the foundation for the mill.

Bodie has reached a depth of 342 feet and shows two and one-half feet of clear quartz in the vein and about the same width of mixed quartz. At a depth of 350 feet it is proposed to put in a station and commence drifting on the vein toward the San Poil ground at Republic. They expect to catch a pay chute on this level. They are now expecting their new machinery to arrive most any day.

In Number 2 tunnel of Republic Mine the cross cut on the south drift is completed and the ore body is found to be 53 feet in width. The entire body is of good value and will be run through the new mill when completed. The main south drift has about 300 feet to run to reach the Jim Blaine line.

The Palmer Mountain tunnel has reached 2546 feet in length, gaining 1200 feet vertical depth. It has cut 15 veins and they are drifting on seven of them, all of which are making fine showings. It is claimed over \$100,000 has been spent in development, and that they have \$100,000 for future work and a large amount of treasury stock on hand. The last 500 feet run in the tunnel cut three more veins, one of which carries six feet of

high grade ore. The ores are found to be greater in value and more evenly distributed in the veins as depth is gained, placing beyond question their permanency.

A sensational suit has been filed in the Superior Court at Spokane, W. C. Sivyer et al against G. A. Sonneman and Jay Lawyer. The complaint alleges that the Dora Gold mine was salted with Republic ore.

FOREIGN MINING NEWS

BRITISH COLUMBIA.

The Rossland shipments of ore for the year to December 1st amounted to 164,408 tons.

Ramble-Cariboo declared another dividend of one cent per share, payable January 1, 1900. The dividend declared last month has just been paid. There is said to be enough ore in sight for three years' operations. Up-raises are being made from the 350-foot level. The lower tunnel is being run beyond the vein, to tap at greater depth another chute of ore that is known to exist.

The crosscut from No. 3 tunnel, in the I. X. L., has been driven 55 feet, and is expected to strike the ledge shortly. It will give a depth of 150 feet on the ore.

Some 60 men are now employed preparing ground and buildings for machinery ordered for the Greenwood smelter. The stone foundation for sample mill will be 60x100 feet in size. The big flues to carry fumes from the furnace is nearly completed. The frame store house, 24x44 feet and blacksmith shop, 20x30 are finished. Stables will accommodate 10 horses, and is 28x45 feet and the carpenter shop is 26x46.

MEXICO.

One of the best propositions at Alamo, Lower California, is in the hands of John M. Albright and Thomas Kneale of San Diego. They are working over the tailings of the Princess Mine, and now have the work about one-third completed. The dump contained in the neighborhood of 5,000 tons of tailings. The cyanide process is used. Albright & Kneale expect to purchase the tailings of other mines in the camp. Altogether the camp is in better condition than since its discovery. Many claims located in the early days, but never worked, are turning out to be the best in that section.

The company of Pittsburg capitalists working the San David, Telemaco and Ulysses claims, formerly owned by the Princesa Company, are apparently making a good thing of it. They have 90 men in their employ, under the direction of Geo. P. Brown, and expect to buy the three claims upon the expiration of their bond, about the first of the year. Other companies, notably the one in which Senator Cockrell of Missouri is interested, are doing well.

The Guanajuato Consolidated Mining and Milling Company has no trouble supplying its present mill, which is crushing steadily 50 tons of ore a day. Its October production was about \$20,000.

The management of La Descubridora Mine, thirty miles west of Mapimi, Durango, has contracted with the El Paso Foundry and Machine Company for two new furnaces of 300 tons capacity each, so that when completed the smelting capacity of this mine will

be 1,050 tons a day. The company will build a railroad from Mapimi to the mine in the near future.

La Bufa, the silver mine near Barranca, Sonora, paid a dividend of \$1500 per share in November. It is owned by Colorado parties.

J. J. Moylan has entered into a contract with M. P. Boss, whereby the latter will develop the rich mining properties of Mr. Moylan in Guerrero.

The registration of new mines continues in Durango, not only by Mexicans, but by Americans as well. Most of the new mines are gold and silver bearing.

Latest Mining Decisions.

Prepared for THE MINING AND METALLURGICAL JOURNAL, by
Andrews & Murdoch, Berrien Springs, Michigan.
Credit must be given when reprinted.

The statute respecting the location of mining claims should be construed with liberality, and the sufficiency of the location, with reference to natural objects or permanent monuments, is simply a question of fact. *Farmington Gold-Min. Co. vs. Rhymney Gold & Copper Co.*, 52 Pac. Rep. (Utah) 852.

Whether or not a mining claim is marked on the ground sufficiently to show a compliance with the first clause of section 2324, Rev. St. U. S. is a question of fact, to be determined from proof aliunde, and the manner of marking is not required to be stated in the notice. *Farmington Gold-Min. Co. vs. Rhymney Gold & Copper Co.*, 58 Pac. Rep. (Utah) 832.

Where a mining location is made in good faith, the locator should not be held to a strict technical compliance with the law in respect to his location notice, and if, by any reasonable construction, in view of the surrounding circumstances, the language employed in the description will impart notice to subsequent locators, it is sufficient. *Farmington Gold Min. Co. vs. Rhymney Gold & Copper Co.*, 58 Pac. Rep. (Utah) 832.

The trial court having found, inter alia, that plaintiff and its grantors have been in possession since location, and they have complied with the laws of the United States, and the local laws, customs, and regulations of the mining district, and the record containing no evidence to the contrary, this court must assume that the finding is correct, and hold that the claim was sufficiently marked on the ground. *Farmington Gold-Min. Co. vs. Rhymney Gold & Copper Co.*, 58 Pac. Rep. (Utah) 832.

GENERAL NEWS

California Iron.

Amid the great boom in the field of iron production, it doesn't cost anything to remember that California has some of the richest and most immense iron deposits which nature has gathered in small places about this world, and that economic conditions will probably arise which will in the not so very far distant future make these stores of iron things to be reckoned with in the great iron markets of the world.

While immense bodies of valuable iron ore occur in a number of localities from Shasta, Nevada and other Northern Counties, to the South, the greatest deposits are in San Bernardino and Nevada Counties. If these de-

posits were as near to the transportation, smelting, market and other conditions of the iron trade as the ones of the Mesaba range in Michigan, the latter, for which lake freight rates have more than doubled, would be in eclipse.

Probably the largest deposit on the coast is in San Bernardino County, sixteen miles from Newberry, in the desert, and this is one of the largest deposits of iron in the United States. It has been frequently described in official reports, but it has never yielded a pound of iron. Then at the minarets in Madera County in the Sierra Nevadas is another wonderful store of iron. It is a hematite and magnetite ore running from 64 to 66 per cent of iron, and one vein exposes a mass 300 feet wide, 1500 feet high and two miles long. What is in sight would supply the world for years. The other iron stores of California are varied and vast.

The trouble with California iron ores is, of course, that with the cost of fuel and so on out here, a ton of Alabama pig iron can be brought here for about the cost of the fuel to smelt a ton of California ore. California's stores of iron are away from both transportation and fuel. But while the iron trade is booming and ruling the industrial world and being its barometer, we may also remember that in California's great future the time may come ere long when the production of iron, which cuts absolutely no figure now, will be one of the great factors in its mining and industrial life. California iron ores will be smelted whenever conditions allow a profit on the operation. How and when these conditions will become present will not be prophesied here. But every related prospect seems to lend to the ultimate production of California iron ore.

The multiplication of cheap electric power in the Sierras is one thing. The oil boom with its great possibilities of the production of cheaper fuel in the forms of oil and gas presents another possibility. Almost in sight of the towering minarets above the San Joaquin Valley men are swarming over the ground in which nature has stored fuel and the vast tonnage of the Great Lakes cannot take Michigan iron ore fast enough at treble rates toward Pittsburg over several times the distance from the minarets to the oil fields or the coast.

Mr. Guillermo C. Dingey, who has been general manager of the Pachuca Foundry in the State of Hidalgo, Mexico, for the last five and a half years, left the Pachuca for Chihuahua. Mr. Dingey will assume the position of General Superintendent of the Compañia Industrial Mexicana de Chihuahua.

Work on the Parral and Durango Railroad has been suspended, owing to certain difficulties existing between the contractors and directors of the road. The matter, it is understood, will be settled in the United States courts, as all contracts and agreements were signed in the United States.

Mining in Southern California has received such an impetus and new investors are making so many inquiries concerning same that we have been compelled to refer our readers and others to our article "Mining in Southern California" by O. S. Breese, in our issue of November 15, 1899, page 43.

The article referred to does not give any detailed information regarding the produc-

tion of any particular mines, or their location, but treats of the industry generally as it is at present in the Southern part of the State of California. Our readers and subscribers are invited to correspond with our Los Angeles office when seeking information concerning the mining progress of the West, and same will cheerfully be furnished.

PERSONAL NEWS ITEMS

LEW E. AUDURY, mining engineer of Los Angeles, has returned from extensive mine examinations in the Dos Cabezas District, and in the vicinity of Bisbee, Arizona.

D. C. JACKLING, who for some time past has been Superintendent of De Lamar's Golden Gate Mill at Mercur, Utah, has accepted the superintendency of the Republic Mill Co. at Republic, Wash.

AUGUST CHRISTIAN, chief engineer of the Anaconda Coppe, Mining Company, of Butte, Mont., has been looking over mines about Copper Creek, Colo.

JNO. M. WRIGHT succeeds A. H. RICKETTS in the chairmanship of the Mineral Lands Committee of the California Miners' Association.

FORAES RICKARD, of Central City, Idaho, has been in Clear Creek County during the past week looking at mining property for Colorado Springs parties.

H. D. CRIPPEN of the Jackson Drill & Mfg. Co. of Denver, Colo., has returned from a trip through New Mexico.

ROY HOPPING, dealer in and collector of mineral specimens, has changed his New York address from 5 Dey street to 129 Fourth Avenue.

J. G. B. HOLLINGSHEAD, of Montana, is examining California copper properties for the Butte & Boston Mining Co.

R. M. JESSUP, of Central City, Colo., has been appointed assistant superintendent for the Gold Coin Mines Company, operating in Gilpin County.

E. BOYCE, President Western Federation of Miners, is now in Butte, Montana.

HUGH SUTHERLAND, managing director of the Dominion Copper Mines, Limited, of the Boundary District, B. C., and W. A. CAMPBELL, of Greenwood, B. C., have been visiting Republic, Wash.

T. A. RICKARD has returned from London to Denver, Colo.

BEN WILLIAMS has resigned his position as manager of the Copper Queen Consolidated Mining Company at Bisbee, Ariz. It is said that Mr. Williams successor will be Mr. Walter Douglass, son of the President of the company.

F. W. BRADLEY has returned from Grass Valley, Cal., to San Francisco.

JOHN V. N. DOTT, who has been acting as chemist for the Golden Reward Smelter, has resigned to accept a similar position with the Northwestern Gold and Silver Extraction Company, that is running a cyanide plant at Deadwood, S. Dak.

BENEDICT CROWELL, of the firm of Crowell & Peck, of Cleveland, Ohio, is in Salt Lake City, examining mining properties in various camps in the vicinity.

DUDLEY GRAY is collecting Cripple Creek, Colo., gold ore as specimens for exhibition at the Paris Exposition.

JOHN B. LAW has resigned his position as general manager of the collieries of the Newton Coal Mining Company at Pittston, the Old Forge Coal Company at Duryea, and the Girard Coal Company at Mt. Carmel, Pa. He is succeeded by James C. Neale. The controlling interests of these companies is held by Philadelphia men, with Frank Patterson as president.

C. L. DIGNOWITZ, the successful mining promoter, was in Salt Lake City last week, and during his stay there devoted considerable time in making an inspection of several of Utah's most popular mining camps.

W. J. CLARKE, foreign manager of the General Electric Co., expects to return from South America next month.

THEO. F. VAN WAGENEN, of Denver, Colo., who visited Grants Pass last September, returned to Grants Pass last week.

GEO. E. AMES, JR., of the City of Mexico, Mex., until recently with Messrs. Samuel Hermanos, has severed his connection with that firm and opened a machinery and general mining supply house.

C. H. MCINTOSH, of British Columbia, is examining mining property at Sumpter, Ore.

DR. F. P. HICKS, a Tacoma, Wash., mining man, has returned from Ketchikan, Alaska.

W. H. NONNOLD, formerly of Calaveras, Co., Cal., is now manager Coronado Mine, Metcalf, Arizona.

G. H. KINGSWELL and W. H. SHOCKLEY have finished a mineral survey in the Chinese provinces of Shensi and Shansi.

E. A. KIESSLING, foreman of the Oregon Bonanza property, was in Grant's Pass, Oregon, last week, from Williams. He says the Oregon Bonanza people have started a tunnel on their property, to tap the ledge at the depth of 350 feet, they are now in 45 feet, and working two shifts of men. He says the shaft they have down 140 feet shows a 3½ foot solid ledge of copper ore and runs \$74 to the ton.

HERMAN LANDAU succeeds Jas. Judd as chairman Associated Gold Mines of Western Australia.

J. W. HANSON, of the San Francisco Giant Powder Co., is in Tucson, Arizona.

NEW INCORPORATIONS IN THE MINING AND METAL INDUSTRIES

CALIFORNIA.

Poso Oil Co., Fresno. General oil business. Capital, \$100,000. Incorporators: W. H. Bradley, of Selma; L. G. Hall, J. S. Bedford, G. L. Long, F. M. Hague, S. McKay, W. D. Fook, all of Fresno, and others.

Mammoth Oil Co., Fresno. General mining business. Capital, \$300,000. Incorporators: H. M. MacLymont, J. Berry, G. L. Hoxie, H. C. Smith, all of Fresno; F. B. Lindsey, of Sanger.

Kern & Trinity Mines Co., San Francisco. General mining business. Capital, \$200,000. Incorporators: G. L. Blair, E. C. Ward, W. H. Davenport, H. C. Caullelow, all of San Francisco; W. H. Waterhouse, of Oakland.

Wallace Gold Placer Mining Co., Stockton. General mining business. Capital, \$100,000. Incorporators: W. Tucker, L. W. McKee, A. J. Taylor, H. N. Toemper, A. N. Petty, A. C. Miller, all of Stockton.

Fortuna Mining Co., San Francisco. General mining business. Capital, \$50,000. Incorporators: F. W. Schurman, W. Bohle, C. F. Fahrback, H. F. Peterson, W. G. Stahl, Jr., all of San Francisco.

Golden Gate Oil Producing Co. General mining business. Capital, \$100,000. Incorporators: W. R. Thomas, D. O. Castle, S. E. Latta, W. J. Rhoads, S. M. Spurrier, all of Stockton.

Mendota Oil Co., San Francisco. Capital, \$500,000. Incorporators: F. S. Chadborne, H. J. Barling, W. B. Wilshire, W. D. Sanborn, W. H. Snedaker, all of San Francisco.

Sonora Quartz Mine Development Co., San Francisco. General mining and milling business. Capital, \$500,000. Incorporators: E. L. Coombs, of Napa; F. B. Lloyd, H. E. Wise, J. Kirby, J. Garland, A. N. Start, F. B. Lloyd, F. Homer, all of San Francisco; R. G. Hart, Sr., H. R. Wiley, both of Berkeley.

Celtic Gold Mining Co., San Jose. General mining business. Capital, \$15,000. Incorporators: E. J. Crawford, W. E. Blauer, T. A. Perrin, J. W. Edmundson, of San Jose; G. Deeney, of Columbia.

Numitor Gold Mining Co., Chicago Park. General mining business. Capital, \$200,000. Incorporators: C. A. Pusheck, R. Riley, A. R. Pusheck, W. McDonald, W. Sternitzky, all of Chicago Park.

Western Land & Oil Co. of Hanford, Hanford. General mining business. Capital, \$250,000. Incorporators: O. P. Lane, J. H. Hopkins, A. Leoni, J. T. Ramsey, A. G. Park, all of Hanford.

St. Valentine Mining Co., Santa Barbara. General mining and milling business. Capital, \$100,000. Incorporators: A. B. Williams, G. F. Frenwith, C. Loveday, A. C. Grant, W. R. Grant, J. H. Burson, T. R. Dawe, W. Ealand, C. A. Storke, all of Santa Barbara.

Louis Creek Oil Co., Hollister. Mining. Capital, \$100,000. Incorporators: G. N. McConnell, E. E. Holbrook, P. F. Brown, R. P. Stephenson, all of Hollister; P. E. G. Auger, S. F. Saffell, N. C. Briggs, W. K. Brown, all of San Juan.

Victor Oil Co., San Francisco. Mining. Capital, \$500,000. Incorporators: C. Bone, W. W. McNair, J. H. Sayn, B. C. Hartson, H. R. Hathaway, all of San Francisco.

S. P. Placer Mining Co., Fresno. Capital, \$200,000. Incorporators: R. S. Bademan and others.

Northfield Oil Co., Fresno. General mining business. Capital, \$200,000. Incorporators: A. B. Smith, H. Nathan, G. W. Wylie, C. A. Teller, all of Fresno; I. F. Paston, of Selma; C. D. Pike, of San Francisco; E. Seligman, of Dinuba.

Merchants' Mutual Oil Co., San Francisco. General mining business. Capital, \$200,000. Incorporators: G. J. W. Stark, C. W. Camm, of Oakland; J. L. McCormick, J. A. Stutz, J. I. Sparrow, T. L. Heimer, A. B. Knox, F. E. Booth, all of San Francisco; G. W. Forsyth, of San Jose.

Twin Eagle Mining Co., Downieville. General mining business. Capital, \$50,000. Incorporators: J. N. Hastings, J. S. Wilbur, E. McGary, Jr., J. W. McGary, all of San Francisco; F. G. Gould, of Alameda.

Wheatville Oil Co., Wheatville. General mining business. Capital, \$28,000. Incorporators: E. A. Wait, W. W. Bloyd, Sr., D. C. Francis, A. M. Bentley, T. Cowan, all of Wheatville, and others.

Belmont Oil Co., Los Angeles. General mining business. Capital, \$200,000. Incorporators: W. A. Johnson, Los Angeles; G. L. Lindsay, J. J. Newman, E. Rhodes, H. Percy, C. E. Newman, all of China.

East Side Oil and Gas Co., Visalia. General mining business. Capital, \$272,000. Incorporators: D. Calcote, J. W. Fewell, R. F. Roth, all of Visalia; O. Kellogg, of Parlier; J. E. Elwood, of Sanger.

Oakland Oil Co., Oakland. General mining business. Capital, \$20,000. Incorporators: D. D. Stark, A. J. Samuel, of Alameda; W. T. Sesnon, of San Francisco; C. S. Banard, E. R. Tubb, both of Oakland.

West Shore Oil Co., Oakland. General mining business. Capital, \$20,000. Incorporators: M. McWhorter, of Bakersville; A. J. Samuels, of Alameda; J. M. Bartlett, W. E. Knowles, of Oakland; S. Gale, of Berkeley, and others.

Black Mountain Mining Co., Selma. General mining and milling business. Capital, \$100,000. Incorporators: M. Sides, J. F. Davies, E. B. Waterman, all of Selma; L. L. Cory, of Fresno; J. Noonan, D. S. Snodgrass, both of Letcher.

Buckhorn Oil & Transportation Co., San Francisco. General mining business. Capital, \$200,000. Incorporators: M. I. W. Smith, J. H. Doolittle, G. B. Merrill, M. L. Davis, W. Ames, all of San Francisco.

Santa Rita Gold Mining Co., San Francisco. General mining and milling business. Capital, \$100,000. Incorporators: W. Delaney, L. H. Levesque, J. B. McGlew, W. W. Sanderson, all of San Francisco; J. J. Kilbride, of Oakland.

Reedley Oil Co., Reedley. Mine for oil. Capital, \$250,000. Incorporators: J. S. Jones, A. B. Clark, H. F. Winnes, W. W. Green, J. Saile, all of Reedley, and others.

Tar Canyon Oil Co. General mining business. Capital, \$100,000. Incorporators: F. H. Gibson, P. A. Bergerot, W. I. Brobeck, G. B. Gibson, J. A. Wilson, M. McGowan, all of San Francisco.

Basin Consolidated Mines, San Francisco. General mining business. Capital, \$100,000. Incorporators: H. F. Buwer, of London, England; J. O. Whitney, W. Martin, J. S. Severance, C. H. Ludley, all of San Francisco.

Commonwealth Oil Co., Stockton. Mining business. Capital, \$100,000. Incorporators: H. M. Hammore, of San Francisco; J. Doyle, A. R. Hopkins, J. K. Dempsey, M. Brisso, A. V. Scanlon, J. W. Petty, all of Stockton.

Red Slide Mining Co., San Francisco. General mining business. Capital, \$24,000. Incorporators: M. E. Sanborn, of Yuba City. P. S. Turner, Annie M. Turner, both of Oakland; J. N. Turner, E. H. Hart, both of San Francisco.

Cantura Oil & Development Co., Fresno. Mining business. Capital, \$300,000. Incorporators: A. Gordon, T. E. Langley, W. M. Wyatt, D. C. McDougall, G. W. Smith, A. E. Snow, G. W. Wylter.

Iowa Mining Co., Fresno. General mining business. Capital, \$30,000. Incorporators: C. S. Pierce, D. C. Johnston, D. A. Jackson, all of Fresno; E. P. Taylor, of Marion; T. R. Warriner, J. Q. Anderson, both of Cedar Rapids, Ia., and others.

Plumas Star Mining Co., San Francisco. General mining business. Capital, \$100,000. Incorporators: W. T. Wallace, W. H. Martin, H. R. Mann, T. B. Bishop, C. S. Wheeler, W. W. Deamer, all of San Francisco; E. C. Robinson, of Oakland.

Buckeye Oil & Development Co., Kern. General mining business. Capital, \$25,000. Incorporators: E. D. Jones, of Tulare; W. A. Snyder, C. J. Pierson,

C. H. Luce, E. C. Ralston, J. W. Shaffer, all of Kern; W. P. Lowry, of Los Angeles; S. N. Reed, of Bakersfield.

Morris-Jones Oil Co., Los Angeles. Mining business. Capital, \$4,000. Incorporators: W. W. Slayden, C. M. Jones, M. Van Sickle, P. W. Dooner all of Los Angeles; H. R. Slayden, of Pasadena.

Germania Oil Co., Modesto. Mining business. Capital, \$100,000. Incorporators: H. Christ, A. Seifvater, A. Seller, O. McHenry, T. C. Hocking, H. Vogelmann, J. E. Ward, all of Modesto; J. Simon, of Stockton; W. W. Brown, of San Francisco.

Rocket Mining Co., San Jose. General mining business. Capital, \$200,000. Incorporators: J. A. Hicks, of Los Gatos; H. H. Main, W. Ostermar, W. J. Rogers, F. J. Brandon, all of San Jose.

Dewey Mining & Milling Co., San Diego. General mining business. Capital, \$1,000,000. Incorporators: L. F. Doolittle, J. A. Heath, S. G. Ingle, W. R. Farnsworth, F. P. Frary, G. Puterbaugh, J. S. Akerman, all of San Diego.

Hanford Cholame Oil Co., Hanford. Mining business. Capital, \$250,000. Incorporators: N. Weisbaum, R. Mills, J. Manasse, all of Hanford; J. W. Fisher, of Parkfield; J. Levy, A. Goldberg, C. E. Barker, all of Visalia.

Gaba River Gold Dredging Co., San Francisco. Dredging, mining, etc. Capital, \$110,000. Incorporators: H. Hilp, G. A. Kornberg, A. Cerf, W. W. Prentley, H. Fress, all of San Francisco.

Alliance Oil Co., San Francisco. Mining business. Capital, \$100,000. Incorporators: A. P. Umben, H. A. Buck, of San Francisco; J. G. McCall, R. W. Church, both of Oakland; E. C. Chapman, of Warren County, Pa.

Alta Oil Co., Dinuba. General mining business. Capital, \$100,000. Incorporators: J. D. Pillsbury, O. A. Boyd, of Traver; E. Seligman, S. K. Green, R. E. L. Morton, all of Dinuba, and others.

Richfield Oil Co., Fresno. Mining business. Capital, \$100,000. Incorporators: J. Hall, A. P. Shepard, J. A. Benham, J. R. Green, B. T. Scott, M. Saier, all of Fresno; J. W. Whitson, C. Chisholm, J. H. Hall, all of Selma.

Klamath River Hydraulic Mining Co., San Francisco. General mining business. Capital, \$100,000. Incorporators: T. T. Tighe, of Trinidad; W. H. Cameron, H. Stevens, J. P. Tighe, A. G. Allen, all of San Francisco.

COLORADO.

Pleasant Valley Silver Lead Mining Co., Central City. Mining business. Capital, \$100,000. Incorporators: J. Mitchell, Jr., H. G. Pease, D. W. Brown, H. R. Brown, E. E. Shumway, all of Central City.

Crown Creek Alaska Hydraulic Gold Mining Co., Denver. Mining business. Capital, \$300,000. Incorporators: E. L. Campbell, J. S. Spitman, J. B. Feehan, all of Denver.

Mary Cashen Mining Co., Colorado Springs. Mining business. Capital, \$1,500,000. Incorporators: C. Edsall, J. P. Sweeney, J. P. Pomeroy, B. B. Wagener, W. T. Bland, all of Colorado Springs.

Silver Supply Co., Silverton. Mining and miners' supply business. Capital, \$50,000. Incorporators: S. T. Annear, W. W. Gremes, T. P. Neely, all of Silverton.

Tarshish Mining & Leasing Co., Leadville. Mining and leasing. Capital, \$500,000. Incorporators: T. P. Mitchell, C. Hayden, F. K. Porter, all of Leadville.

Olympia Gold Mining & Milling Co., Colorado

Mining business. Capital, \$1,350,000. Incorporators: D. H. Waite, D. H. Bruce, W. O. Temple, all of Colorado Springs.

Anglo-Dutch Mining Co., St. Louis, Mo. Mining business. Capital, \$200,000. Incorporators: N. Garstin, P. A. Garstin, D. Ramsey, all of Colorado Springs; A. T. Wyers, of St. Louis, Mo.

Eagle Mining & Investment Co., Colorado Springs. Mining and investing. Capital, \$1,250,000.

Magnolia Gold Mining Co., Colorado Springs. General mining business. Capital, \$1,250,000. Incorporators: A. B. Moulder, N. S. Gandy, S. R. Bartlett, W. E. Frinago, all of Colorado Springs.

Southern Bay Gold Mining Co., Colorado Springs. General mining business. Capital, \$1,250,000. Incorporators: A. L. Shepherd, H. M. Blackmer, R. P. Davis, N. G. Gandy, A. J. Bendle, all of Colorado Springs.

DELAWARE.

Green Mountain Copper Co. General mining business. Capital, \$50,000. Incorporators: E. A. Haggot, of Yavapai County, Arizona; W. B. Clark, G. W. Roberts, of Wilmington.

ILLINOIS.

Sterling Lead & Zinc Mining Co., Chicago. Mining and smelting business. Capital, \$5,000. Incorporators: T. F. Mullen, H. W. Lewis, J. M. Cameron, all of Chicago.

MAINE.

Oneida Copper Co., Portland. Mining business. Capital, \$2,500,000. Incorporators: A. E. Elliott, of Gloucester; H. L. Baker, of Boston, Mass.; B. A. Longridge, of Boulder, Col.; H. C. Farr, A. C. Chapman, both of Portland.

Rock Creek Gold Mining Co., Pittsfield. Mining business. Capital, \$1,000,000. Incorporators: G. H. Ash, of Boston, Mass.; E. D. Smith, G. H. Morse, both of Pittsfield, Me.

MINNESOTA.

Paragon Mining & Manufacturing Co., St. Paul. General mining business. Capital, \$100,000. Incorporators: G. P. Sandberg, G. S. Monson, F. C. Hammer, M. A. Beckman, R. H. Ames, all of St. Paul.

MISSOURI.

Big Hickory Mining Co., Kansas City. General mining business. Incorporators: F. D. Crabbs, F. A. Doggett, W. C. Root, T. Gowdy, C. E. Hochstetler, T. Bishop, J. D. Seitz, all of Kansas City, and others.

Regent Lead & Zinc Mining Co., St. Louis. General mining business. Capital, \$60,000. Incorporators: C. E. Carroll, W. Keightley, A. R. Schollmeyer, J. L. Ennis, S. B. Parsons, A. H. Kollas, A. R. Schollmeyer, Sr., all of St. Louis.

Cadmus Mining Co., Joplin. General mining business. Capital, \$37,500. Incorporators: D. A. Gault, W. E. Aaron, R. R. Armor, all of Joplin; A. L. Fuller, E. T. Holmes, G. E. Terrell, S. R. Kernnisk, all of Cleveland, O.

Robert N. Denham Mining Co., St. Louis. General mining business. Capital, \$50,000. Incorporators: R. N. Denham, O. B. Givens, both of St. Louis; J. B. W. Amsden, of Joplin.

NEW JERSEY.

Alma Bessemer Ore Mining Co., of New Jersey.—Principal office, No. 76 Montgomery street, Jersey City. Mining capital, \$100,000. Incorporators: Alfred C. P. Quimby, John T. Rowland, Jr., William J. Ball, all of Jersey City.

Overleigh Zinc Mining Co.—Principal office, No. 106 Market street, Camden, N. J. Mining capital, \$50,000. Incorporators: William H. Greene, Samuel W. Cooper, Charles B. Adamson, all of Philadelphia.

California Lithia Mining Co.—Principal office, the Corporation Trust Co. Building, Jersey City, N. J. Mining, etc. Capital, \$500,000. Incorporators: Charles O. Maas, Fred. A. Hoffman, Harry D. Patton.

Arnold Leasing & Mining Co.—Principal office, New Jersey Registration & Trust Co.'s Building, East Orange, N. J. Mining capital, \$250,000. Incorporators: Walter Whittlesey, Albert N. Parlin, S. G. Collins.

PENNSYLVANIA.

Gallitzin Coal & Coke Co., Philadelphia. Manufacturing and sale of coal and coke. Capital, \$50,000. Incorporators: J. L. Mitchell, W. S. Pilling, T. Crane, C. Berg, J. A. Jardine, all of Philadelphia.

Mingo Coal Co., Pittsburgh. Mining and sale of coal and coke. Capital, \$1,000. Incorporators: R. T. Rossell, J. H. Beall, G. E. Shaw, J. C. Bily, G. B. Motheral, all of Pittsburgh.

Brinker Coal & Iron Co., Dutch Hall. Mining and sale of coal and iron. Capital, \$50,000. Incorporators: G. Mellinger, L. Mellinger, both of Renoldsville; H. R. Wilson, of Clarion, Pa.; E. T. Brinker, W. S. Pitman, both of Buffalo.

Whimo Lead & Zinc Co., Cleveland. Mining and smelting business. Capital, \$50,000. Incorporators: F. R. White, J. D. Cline, C. A. Post, D. F. Sherbondy, H. H. Johnston.

National Mining Co., Pittsburgh. Mining and sale of coal and coke. Capital, \$1,000. Incorporators: R. T. Rossell, J. H. Beal, G. E. Shaw, J. C. Bily, G. B. Motheral, all of Pittsburgh.

RHODE ISLAND.

Glen Almond Mica & Mining Co., Providence. General mining business. Capital, \$100,000. Incorporators: F. S. Shirley, J. P. Burlingame, C. N. Snow, all of Providence; A. L. Mason, of Newport.

WEST VIRGINIA.

California Quicksilver Mines Co., Boston Mass. General mining and milling business. Capital, \$750,000. Incorporators: H. E. Pearson, of Newburg; R. A. Atwood, C. W. Smith, A. P. French, all of Boston, Mass.; T. O. Potter, of Denver, Col.

Narragansett Gold Mining Co., Boston, Mass. General mining business. Capital, \$1,000,000. Incorporators: E. E. Kent, F. E. Tuttle, C. C. Corbett, of Boston; R. S. Whitcomb, of Malden, Mass.; E. P. Bellows, of Gloversville.

South American Land & Exploration Co., Ltd., New York City. Mining and milling business. Capital, \$5,000,000. Incorporators: F. C. Nicholas, of Summit; F. N. Whitney, of Elizabeth, N. J.; H. S. Byrne, of Yonkers; G. S. Bixby, L. E. Carr, both of New York City.

Red Bird Gold Mining Co., Salmon City. General mining and milling business. Capital, \$500,000. Incorporators: W. E. Carter, R. E. Dwight, E. W. Burdick, T. A. Callaghan, C. H. Fowler, all of New York City.

WYOMING.

Calumet Mining, Milling & Smelting Co., Encampment. General mining business. Capital \$500,000. Incorporators: E. C. Perisho, L. Vanderbee, Jr., both of Platteville, Wis.; E. M. Benson, T. H. Andrew, all of Denver, Col.

Colorado-Wyoming Copper Mining Co., Encampment. Mining business. Capital, \$1,000,000.

First Quality in all Lines

Mining Machinery AND Supplies

STEAM	{	ENGINES	{	ENGINES
		HOISTS		HOISTS
		PUMPS		AIR COMPRESSORS
		BOILERS		PUMPING PLANTS
		GASOLINE		

Our Compined Geared Gasoline Engine and Hoist, and Combined Gasoline Engine and Air Compressor Especially adapted for Mining Purposes.

Fairbanks' Standard Scales, Mining Cars, Car Wheels, Spiral Riveted Pipe, Pipe and Fittings,

Fairbanks, Morse & Co.,

Chicago, Cleveland, Cincinnati, Louisville, Indianapolis, St. Paul, Minneapolis, St. Louis, Kansas City, Omaha, Denver, San Francisco, Los Angeles, Portland, Oregon.



The Mining And Metallurgical Journal

THE MARKETS.

All quotations, financial reports and other statistical figures given under this head are New York Quotations, unless otherwise stated in each item. These figures are carefully revised each issue, and constitute a very accurate compilation of statistical matter.

METALS.

The following are the Silver, Copper and Lead quotations for the last two weeks:

	SILVER.	COPPER.	LEAD
Dec. 1	58 1/2	17 00	4 60
" 2	58 1/2	17 00	4 60
" 4	58 1/2	17 00	4 62 1/2
" 6	58 1/2	17 00	4 62 1/2
" 7	58 1/2	17 00	4 65
" 8	59 1/2	17 00	4 70
" 9	59 1/2	17 00	4 70
" 11	59 1/2	17 00	4 75
" 12	58 1/2	17 00	4 75
" 13	58 1/2	17 00	4 80
" 14	58 1/2	17 00	4 80

SILVER

The Silver market has been steady and dull showing only small fractional changes during the week and closing at 26 1/2 d. in London.

COPPER.

Prices remain unchanged from those quoted last week. Lake copper 18 1/2 c. Electrolytic in cakes, wirebars and Ingots 17 @ 17 1/2. Cathode 16 1/2 @ 16 3/4, casting copper 17 nominal. The foreign market is still dominated by difficulties betw. England and Transvaal. London

is quoted, English tough £78, 15s @ £79 5s, best selected £80 5s @ £80 15s. India sheets £83 @ £83 10s.

LEAD.

Lead continues in good demand and with no change in prices. New York being quoted at 4.55 @ 4.60c.

The foreign market has been irregular but the tendency is upwards. Spot is quoted at £15 17s 6d @ £16 2s 6d for Spanish and £16 5s @ £16 7s 6d for English, while futures are at a discount of 5s to 10s.

SPELTER.

The disquieting news from the ore-fields stirred up consumers and a good business has resulted at stiffening prices, New York is quoted at 5.45 @ 5.50.

The foreign market is also firmer and again higher good ordinaries being quoted at £22 12 6d, Specials £22 17s 6d.

ANTIMONY.

Antimony is in good demand. We quote Cooksons at 10 1/2 @ 11c. Hallett's at 9 1/2 @ 9 3/4, U. S. Star and Hungarian 7 1/2 @ 9 3/4 c.

NICKEL.

Nickel continues unchanged and no alternation of prices can be reported. We quote for ton lots 33 @ 36c per lb., and for smaller orders 35 1/2 @ 38c. London prices are 14 @ 16d. per lb., according to size of order.

TIN.

It is quite natural that this article, which is always volatile should suffer in consequence of the unsettled state of affairs abroad and the higher money market. Fluctuations have been rather wide but the close is again firm at £145 15s for spot and £146 2s 6d for three months.

In New York the buying was restricted

to quantities needed to cover immediate requirements although consumption continues at a fair rate. We quote Straits in carload lots at 32 1/2 c f. o. b. New York.

PLATINUM.

The demand for Platinum is good and prices are firmer. New York is quoted \$17.75 per ounce for large lots and \$18 for smaller orders.

POTASSIUM CYANIDE.

Purified, 98 @ 99 per cent., in cases of 120 lb. at 30c. per lb. in 5, 10, 25 and 50 lb tins at an advance.

QUICKSILVER.

The wholesale price in New York has advanced \$1 and is now \$48.00 per flask. The London price has risen to £8 17s 6d per flask, with the same rate from second hands.

THE MINOR METALS.

Quotations are given below for New York delivery:

Aluminum:	
No. 1, 99 per cent. ingots, per lb.	35 @ 37c
No. 2, 90 " " "	31 @ 34c
Rolled sheets, per lb.	38c. up
Aluminum.—Nickel, per lb.	33 @ 39c
Alum. bronze, per lb.	20 @ 33
Bismuth, per lb.	\$1.45 @ \$1.50
Phosphorus, per lb.	48 @ 50c
Magnesium, per lb.	\$2.75 @ 3.00
Tungsten, per lb.	70c
Ferro-tungsten, 60 per cent.	70c

Variations in price depend chiefly on the size of the order.

ACIDS.

Acetic is in good request, muriatic is moving briskly on contract, and sulphuric is unchanged. Blue vitriol is quiet. Only 50 bbls. oxalic acid were imported this week.

The exports from the United States in August amounted to \$12,653.

BRIMSTONE.

There are no arrivals. Spot best un-mixed second \$22 @ \$22.50 per ton and shipments \$21.15; thirds, \$19. The imports of brimstone into the United States in August were 11,109 tons.

NITRATE OF SODA.

Demand is very quiet and quotations for all positions are nominally \$1.65 per 100 lbs. Odd lots can doubtless be had at \$1.62 1/2. The United States imported 18,708 tons nitrate of soda in August.

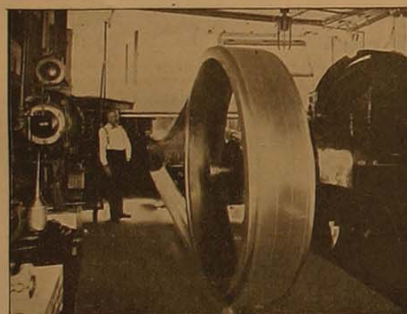
CHEMICALS.

Most of the business done in heavy chemicals is for future delivery, the little doing on spot being at advanced prices. Imports this week included 200 drums, 210 casks and 2 bbls. bleaching powder. Importers expect a curtailment of shipments from England When the Boer war is on, as the merchant vessels will be used for transporting troops to South Africa. Receipts of domestic goods at New York last week included 1055 sacks alkali and 250 drums caustic soda.

Caustic soda high test is quoted per 100 lbs. f.o.b. works at 1.77 1/2 @ 1.82 1/2; in New York, \$1.85 @ \$1.90. Bi-carbonate of soda is quoted per 100 lbs. f.o.b. works, \$1.12 1/2 @ \$1.25. Chlorate of potash crystals in New York are quoted for domestic, \$8.75 @ 9.00; foreign, \$9.25 @ 9.37 1/2; powdered domestic at \$9.25 @ 9.50, and foreign, 9.50 @ 9.75.

CHLORIDE OF LIME.

English prime brands are quoted at 1.65 @ 1.75 with 1.50 @ 1.60 for other brands.



BROWN, DURRELL & CO.

CLING-SURFACE MFG. CO.,

BUFFALO, N. Y.

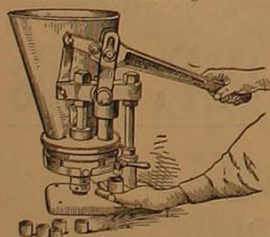
BOSTON, MASS., Aug. 1, 1899.

DEAR SIR:—Having tried Cling-Surface on my 12" dynamo belt (16 feet between centres), I have been able to carry full load with 22" sag on belt with no perceptible slip. It surpasses my expectations and I can recommend it to do all that is claimed for it, if directions are followed.

Yours respectfully,

E. B. PRESCOTT, Engineer.

Patent Pending



The Automatic. This machine will make five sizes cupels of ideal perfection. Capacity 600 an hour. Three designs and grades.

Perfect Cupels

Can be made by anyone with ease and dispatch with

Galkins' Cupel Machines

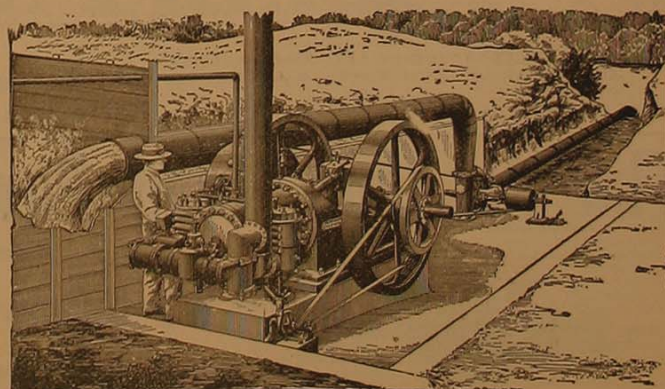
Compact, easily operated, can't get out of order, everlasting.

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Descriptive pamphlet and price list mailed on application.

F. W. BRAUN & CO., Assayers Goods of every Description.

LOS ANGELES, CAL.



LARGEST GASOLINE PUMPING PLANT IN THE WORLD

The illustration shows the gigantic pumping plant recently built by the Hercules Gas Engine Works at the Packer Ranch, Colusa Co. 80 h. p. Hercules Engine, pumping 7200 gallons a minute, 27 feet high. Burns Gasoline or Distillate oil. Cheapest power known. Gas, Gasoline and Oil Engines, 2 to 200 h. p. Send for Catalogue. HERCULES GAS ENGINE WORKS, 216 Bay St., San Francisco.

RIVETED SHEET STEEL WATER PIPE
For Placers, Water Powers, Irrigation, Etc.
THE WEIGLE PIPE WORKS
2949-51 Larimer St. DENVER, COLO.

FINANCIAL NOTES.

AVERAGE PRICES OF METALS.

In New York per 100 lbs. from January 1st, 1899:

Month	Copper	Tin	Lead	Spelter
January	14.75	22.48	4.18	5.34
February	15.30	24.20	4.49	5.38
March	17.54	23.89	4.37	5.31
April	18.03	24.98	4.31	5.67
May	18.25	25.76	4.44	5.88
June	17.93	25.85	4.42½	5.98
July	18.33	29.63	4.52	5.82
August	18.30	31.53	4.57	5.65
September	18.46	32.74	4.58	5.50
October				
November				
December				
Average				

AVERAGE MONTHLY PRICES OF SILVER.

In New York per ounce Troy, from January 1st, 1899, and for the years 1898 and 1897:

Month	1899	1898	1897
January	59.86	56.77	64.79
February	59.42	56.07	64.67
March	59.64	54.90	63.06
April	60.10	56.02	61.85
May	61.23	56.98	60.42
June	60.43	58.61	60.10
July	60.26	59.06	59.61
August	60.00	59.54	54.19
September	58.89	60.68	55.24
October		60.42	57.57
November		60.60	57.91
December		59.42	58.01
Year		58.26	59.79

MONEY IN CIRCULATION.

Comparative statement of the circulation in the United States on Oct. 1st 1899. Comparison being made with statement on September 1st, 1899.

	October 1. Changes	
Gold	\$46,561,185 D.	\$26,372,007
Silver	142,801,005 L.	5,396,932
Legal Tenders	314,954,500 L.	4,824,179
Treas'y & N'U B'k Notes	329,688,956 D.	483,165
Totals	\$1,434,014,746 D.	\$16,634,061

Gold and Silver certificates and currency are not included in this table. By adding the amounts given in this table

with those in the following will give the total amount coined or issued. The figures herewith are furnished by the Bureau of Statistics Treasury Department.

MONEY IN TREASURY.

Comparative statement of changes of money in United States Treasury on Oct. 1st 1899, comparison being made with statement, on Sept. 1st, 1899.

	October 1. Changes	
Gold	\$122,371,989 L.	\$31,353,225
Silver	415,844,704 D.	4,650,483
Legal Tenders	31,726,416 L.	4,824,179
Treas'y & N'U B'k Notes	4,850,547 L.	352,491
Totals	\$73,693,656 L.	\$16,305,978

The Gold and Silver bullion on hand in the Treasury is not included in this statement.

GOLD AND SILVER EXPORTS AND IMPORTS.

At all United States ports, for the month of September, 1899, and 9 months ending September, 1898, and 1899:

	SEPTEMBER 1899	1898
Gold—Exports	\$3,102,810	\$ 618,995
Imports	16,808,341	2,593,894
Excess	I \$13,705,531	I \$ 1,974,899
Silver—Exports	\$5,152,103	\$3,622,041
Imports	2,000,696	2,376,846
Excess	E \$3,151,407	E \$1,245,195

NINE MONTHS ENDING AUGUST.

	1898	1899
Gold—Exports	\$12,781,023	\$12,877,838
Imports	127,343,816	34,268,421
Excess	I \$114,561,793	I \$ 1,390,583
Silver—Exports	\$9,431,500	\$8,738,431
Imports	21,999,224	22,724,095
Excess	E \$18,334,276	E \$16,014,336

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

* WANTS *

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid-up annual subscribers. Other than above \$1.00 per month. Advertisements not accepted for less than one month.

COPPER MINE. State full particulars in regard to development work location, distance from water, price of fuel, character of ore and returns from shipments. Must have at least 1500 feet of development work. Send all information possible. Address,

JAMES HOWARD,

Care The Mining and Metallurgical Journal.
32 Broadway St., New York, N. Y.

GOLD mine anywhere in *United States*, must have at least 1000 feet of development; where coal is not over \$6.00 per ton or wood \$4.00 per cord delivered; plenty of water; no objection to low grade ore if profit can be made by having large plant to amalgamate and concentrate; want 6 months working bond; no property considered unless owners are prepared to deposit certified check for expenses of engineer if property is not as represented. Address with price and full particulars

J. E. M., Mining and Metallurgical Journal,
150 Nassau Street, New York, N. Y.

EXPERIENCED man desires position, who can install, run and keep in repair, Steam, Electrical and Mining machinery, has knowledge of assaying and office work. References. Address: W. H. K., McCLOUD, CAL.

Gold, Silver, Copper, Zinc and Lead Mines.

Partner wanted who would invest \$20,000 in developing a large Mining property located in the Territory of Tepic, Mexico, on the Pacific Coast. Gold mines are averages from 3 to 30 oz. per ton of 2000 lb., Silver from 1 to 38 kilo, Lead from 15 to 30 per cent, Zinc from 20 to 25 per cent, Copper from 5 to 25 per cent. Reports, Maps and Samples sent on application. Waterfalls 500 H. P. and sufficient timber close to the mines. Call or address,

ELIAS GALINDO,
94 Turbide St., Tepic, Mexico.

NOTICE TO STEAM USERS.

The National Association of Stationary Engineers is prepared to furnish Engineers of guaranteed ability for any plant in the city or elsewhere. Give us a call. Address: J. T. CHAMBERS, Sec'y, Engine Room City Hall, Tel. Main 557. Los Angeles, Cal.

METALURGIST and experienced Assayer and Chemist, with practical experience in Copper and Lead smelting, desires position. Speaks Spanish, highest references, address "Globe," JOURNAL office.

WANTED POSITION by experienced Amalgamator and general Mill man. Have worked in the largest mill on Pacific Coast and Mexico, speaks Spanish, highest references. Apply Con. C. W. Geoghegan Assay Office, 956 3rd St., San Diego Cal.

FOR SALE

WILL GIVE one-half interest in a group of five gold claims on the desert for parties who will put up mill and Cyanide plant. Address, J. G. B., Journal Office, Los Angeles, Cal.

A DEVELOPED producing and dividend paying Gold Mine, machinery on ground in active and successful operation. A large copper deposit partly developed, with splendid showing. A fine gold-silver prospect partially developed, lack of capital reason for sale. For reports, maps, etc. Address H. P. DURRELL, El Paso, Texas.

REMAIN Two Stamp Steam Mill at Tucson, Arizona. 15-H. P. Boiler Pump and every thing complete, set up ready for work. In excellent condition, used less than six months. Address DREDGING MINING MACHINERY CO. Kansas City, Mo.

ANTIMONY

BISMUTH

PROSPECTORS having locations of this nature and wishing to sell at once for cash, will do well to address with full particulars, P. O. Box 2078, SAN FRANCISCO, CAL.

CHEMIST, 5 years training and knowledge of Mineralogy, desires position with prospecting party or as assistant in laboratory. Highest endorsements. Address, J. W. FELL, Asheville, N. C.

FOR SALE AT A BARGAIN.

A 60-TON copper smelting Plant, consisting of two 30-ton furnaces, one of which has new seamless liner. Plant is complete in every detail. Also an 80-ton Silver-Lead Furnace, entirely new, never having been set up. All of the above located immediately adjacent to railroad. Enquire of GARDINER, WORTHEN & GOS, dealers in Mining and Mill Supplies, Tucson, A. T.

The Cleveland Mining and Stock Exchange Co.

New England Building, Cleveland, Ohio.

A Reliable Information Bureau for Miners and Investors to obtain **FACTS** Regarding Capital and Mines. Stocks and Mines listed. Send for prospectus.

Morgan-Watson Mining and Construction Co.

800-810 New England Building, Cleveland, Ohio

MINES AND STOCKS { We Buy, Sell, Lease and Bond Mines of all kinds
We Buy, Sell, and Negotiate sales of mining and other stocks,
We Furnish Machinery to work good mines under special arrangement.
We Furnish Capital to develop mines.

JAMES IRVING & CO.

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CHEMICAL DETERMINATIONS ACCURATELY MADE

TOMBSTONE - - - ARIZONA

STEEL CASTINGS

From 1 to 40,000 pounds weight

Of Open Hearth or Chester Steel. True to Pattern, Sound, Solid. Gearing of all kinds and Crank Shafts. Shoes, Dies, Crusher Plates, Busses, Tappets and Roll Shafts. Steel Castings of every description.

Chester Steel Castings Co.,

Works Chester, Pa. Office, Library St Phila., Pa.



Sulphuric Acid

Also Strictly Chemically Pure

AMMONIA and

for Laboratory Use and Fine Chemical Work.

Manufactured by the Western Chemical Co. Denver, Col. For Chlorination. Refining and other processes. Also Muriatic and Nitric Acids, Blue Vitriol, Copperas Refined Sulphate of Soda, Etc.

C. P. Acids

The Jackson Hand Power Rock Drill

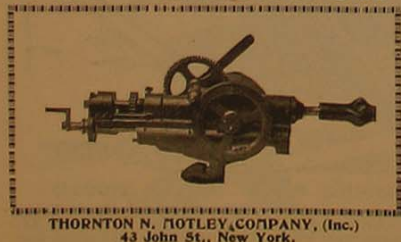
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Write for Circular.

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THORNTON N. HOTLEY COMPANY, (Inc.)
43 John St., New York.

MINING STOCK QUOTATIONS

BOSTON

Adventure	6 13	Mass	10 00
Aetna	4 63	Mixed	21 00
Allouez	—	Mohawk	—
Anaconda	46 50	Napa	—
Aracadian	60 00	Old Colony Con	9 00
Arnold	10 75	Old Dominion	32 63
Atlantic	28 75	Oscoda	86 50
Baltic	24 00	Parrott	46 50
Bingham	15 25	Pioneer	3 00
Bonanza	1 33	Quincy	160 00
Boston & Mont's	355 00	Rhode Island	6 75
Breece	2 50	Santa Fe	12 50
Butte & Boston	79 00	Santa Ysabel	12 50
Calumet & Hecla	780 00	Tamarack	223 00
Catalpa	40	Tecumseh	5 25
Centennial	32 50	Tri-Mountain	9 25
Cochiti	17 00	Victor	—
Copper Range	37 00	Victoria	5 00
Crescent	—	United States	30 00
Dominion Pref.	—	Utah Con	38 00
Franklin	7 75	Washington Ming	2 13
Gold Dredging	—	White Knob	—
Humboldt	1 75	Winona	9 00
Isle Royale	44 00	Wolverine	41 50
Melones	2 50	Wyandotte	3 25

ROSSLAND, BRITISH COLUMBIA.

Brand'n & G'd Crk	29	Kootenay Gold F.	—
Brit-Amor. Cor	—	Lewick	—
Brit-Col Dev. Co	—	Lily May	10
Canad Gld Fields	07 1/2	Lon & Van M.D. Co	—
Cariboo	1 18 1/2	London R. C. G.F. 7	00
Commander	—	Monte Cristo	05 1/2
Deer Park	19	New G'd Flds R.C. 5	50
Dandee	03	Novelty	—
Evening Star	09	Queen Bess Prop.	5 50
Fern	28	Rambler-Cariboo	56
Gold Fields of B.C.	—	Red Mount. View	—
Hattie Brown	—	Reco	—
Hall Mines	—	Silver Bell	—
Homestake	—	Silver Queen	—
Iron Horse	06	St. Elmo	05 1/2
Iron Mask	76	Slocan Star	1 10
Josie	—	Vic. Tr.M. Dev. Co.	—
Jumbo	25	Waverly Mines	—
Kenneth	—	War Eagle Con	2 75
Keystone	—	White Bear	—

SAN FRANCISCO.

Alta	04	Mexican	30
Andes	01	Occidental	20
Belcher	33	Ophir	87
Best & Belcher	36	Overman	19
Bullion	04	Ontario	—
Caladonia	70	Plymouth	—
Challenge	30	Potosi	58
Chollar	31	Quicksilver	—
Confidence	80	Quicksilver pref'd	—
Con. Cal. & Va	1 65	Savage	25
Crown Point	15	Seg. Belcher	03
Deadwood	—	Sierra Nevada	62

Gould & Curry	35	Silver Hill	3 05
Hale & Norcross	—	Standard	36
Homestake	—	Union Con	12
Iron Silver	—	Utah	28
Justice	08	Yellow Jacket	28

COLORADO SPRINGS STOCKS

Acacia	28 1/2	Hayden	02
Alamo	08 1/2	Ingham Con	10
Altamont	—	Isabella	91 1/2
American Con	—	Jack Pot	65
Anaconda	44 1/2	Kimberly	13
Aola	04 1/2	Lexington	21 1/2
Arcadia Cons	04 1/2	Magnet Rock	32 1/2
Argentum Juniata	25 1/2	Matos	15 1/2
Bankers	05 1/2	Montreal	09 1/2
Banner	04 1/2	Mountain Beauty	27
Bob Lee	06 1/2	Mollie Gibson	73 1/2
Creede & C. C.	13	Moon Anchor	39 1/2
Cripple Crk Con	15 1/2	Mount Rosa	39 1/2
Dante	18 1/2	New Haven	03 1/2
Des Moines	05 1/2	Orlolo	08 1/2
Elkton Con	1 17	Orphan	19 1/2
El Paso	41 1/2	Pharmacist	05 1/2
Emma Almee	02 1/2	Pilgrim	2 45
Fanny B.	04 1/2	Portia	04 1/2
Favorite	05	Pr. Albert	07 1/2
Findley	17	Rattler	07 1/2
Fl'wer of the W't	04 1/2	Specimen	13 1/2
Golden Fleece	26	Theresa	09 1/2
Gold & Globe	05	Union	32 1/2
Gold King	84	Union	32 1/2
Gould	30 1/2	Vindicator	1 42
Granite Hill	03 1/2	Work	32 1/2

SALT LAKE CITY

Anchor	50	Joe Bowers Ex.	05
Ajax	98	La Reine	60
Alliance	—	Lower Mammoth	26
Alice	—	Little Pittsburg	3 03 1/2
Bullion Beck	3 05	Mammoth	3 03 1/2
Buckeye	—	Mercur	6 93
Cent. Eureka	68 00	May Day	61
Chloride Point	25	Northern Light	14 1/2
Congor	25	North Swansea	13
Daly	1 41	Omaha	8 20
Daily West	12 73	Ontario	40
Dalton & Lark	03	Petro	29
Dalton	01	Rich. Anaconda	29
Dexter	2 45	Sunshine	30
Daisy	18 1/2	Swansea	3 92 1/2
Eagle	03 1/2	So Swansea	1 35
Eagle & Blue Bell	1 45	Sunbeam	67 1/2
Emerald	12	Sacramento	46
Four Aces	13 1/2	Silver King	45 00
Geyser-Marion	34	Star Consolidated	43
Galena	30	Showers Con	36
Grand Central	5 50	Tetro	05
Golden Eagle	04 1/2	Utah	60
Horn Silver	1 17 1/2	Valco	85
Homestake	04 1/2	West M'tn Pl'cer	11
Ingot	09	Yankee Con	15 1/2
Joe Bowers	17	—	—

NEW YORK.

Adams Con	12	Isabella	92 1/2
Alamo	08 1/2	Iron Silver	54
Alice	60	Jefferson	10
Alliance	—	Jennie Blanche	—
Anaconda Copper	49	Justine	—
Anaconda Gold	44 1/2	King & Pemb	18
Anchors L	65	Leadville Cons	08
Argentum Juniata	24	Little Chief	19
Belcher	20	Mexican	30
Best & Belcher	43	Mollie Gibson	27
Burt Gold	—	Mr. Rosa	15
Breece	1 55	Occidental	15
Branswick	27	Ontario	8 50
Chollar	35	Ophir	90
Chrysolite	—	Pharmacist	08
Comstock Tunnel	04	Phoenix	09
Comstock Stocks	04	Plymouth	08
Comstock scrip.	04	Portland	2 38
Con. Cal. & Va.	1 75	Potosi	80
Cr. & Cr. Creek	11	Quicksilver	1 50
Crescent	15	Quicksilver pfd	7 50
Crown Point	12	Rocky Mountain	—
Cripple Creek Con	16	San Juan Star	—
Deadwood Terra	70	Savage	24
Elkton	1 10	Sierra Nevada	70
Enterprise	—	Small Hope	1 25
Good Samaritan	—	Specimen	10
Gold Coin C. Crk	2 10	Standard Con	2 90
Gold Coin Gilpin	—	Syndicate	—
Golden Fleece	27	Union Con	33
Gould & Curry	30	Utah Con	32 1/2
Gregory Gold	—	Utah Con	10
Hale & Norcross	30	Union Gold	—
High Five	—	Vindicator	—
Homestake	65 00	Work	32
Horn Silver	1 25	Yellow Jacket	25

SPOKANE, WASHINGTON.

Ben Hur	15	Mountain Lion	1 08
Black Tail	14	Morrison	—
Butte and Boston	05 1/2	Number Six	—
Cariboo	—	Pearl	11
Deer Trail No. 2	22	Princess Maude	14 1/2
Golden Harvest	04	Quip	12
Inaugural	04	Rebate	—
Iron Monitor	—	Republic	19
Jim Blaine	31	San Poll	—
Liberty	—	Tom Thumb	17
L. Pine Surp. Con	23	Winnipeg	—
Morning Glory	11 1/2	—	—

DENVER STOCK REPORT.

Aetna	—	Keystone	11 1/2
Anchuria Leland	70	Lillie	—
Anaconda	44 50	Matos	32 1/2
Aracdia	04 1/2	Mollie Gibson	27
Argentum Juniata	25 1/2	Moon Anchor	73 1/2
Banner	04 1/2	Mt. Rosa	39 1/2

Bob Lee	08 1/2	Old Gold	—
Elkton	1 17	Peoples	—
El Paso	41 1/2	Pilgrim	07 1/2
Enterprise	17 1/2	Pine Creek	—
Fanny B	00 1/2	Portland	2 45
Garfield	15 1/2	Prince Albert	04 1/2
Geo. Washington	—	Republic	08
Golden Eagle	—	Sacramento	08
Gold Coin	2 10	Smuggler	—
Gilpin & C. C.	—	Specimen	13 1/2
Gilpin Four	—	Tamarack	—
Golden Fleece	26	Union	32 1/2
Isabella	91 1/2	Virginia M	08 1/2
Iron Glad	08 1/2	Wheels Cons	—
Jack Pot	65	Work	32 1/2

MEXICO

Name of Company	State	Price
Amistad y Concordia	Hidalgo	29
Angustias	Guanajuato	280
Arevalo y Anexas	Hidalgo	200
Asustiana y Anexas	Zacatecas	180
Barradon y Cabras	Durango	40
Bartolome de Medina	Hidalgo	68
Cabezon y An	Zacatecas	15
Candelaria de Pinos	Durango	180
Capusaya	Durango	30
Carmen	Hidalgo	400
Cinco Senores y An	Guanajuato	350
Coronas	Mexico	75
El Oro	Guanajuato	30
El Oro, pref.	Guanajuato	30
Esparanza y An	Mexico	1,600
Gloria	Chihuahua	50
Guadalupe	Guanajuato	235
Luz de Borda Aviador	Michoacan	30
Luz de Borda aviador	Michoacan	120
Luz de Maravillas	Hidalgo	20
Pabellon	"	80
Palma de Somb.	Zacatecas	2,000
Pinales	Durango	1,020
Rafael y Annexes	Hidalgo	500
Real del Monte	Hidalgo	20
Reatauradora	Durango	10
Rosario y Anexas	Durango	195
San Francisco	Hidalgo	410
San Rafael aviador	Hidalgo	20
San Rafael del Oro	Hidalgo	240
Sta. Maria de la Paz	S. Luis Potosi	330
Soledad	Hidalgo	250
Sorpesa	"	50
Trinidad Aviador	Guanajuato	40
Trinidad Aviador	Guanajuato	75
Tlaxingo	Puebla	350
Union Hacida	Hidalgo	80
Zona Min. de Paz	Guanajuato	—

NOTE—The above Mexican stocks are figured on the basis of Mexican silver

CLARENCE HERSEY,
Assayer and Chemist,

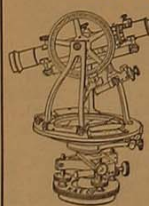
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LEADVILLE, COLORADO

Samples by Mail or Express Re-
ceive Prompt Attention

SPECIMEN ASSAY PRICES:

Gold silver and lead, \$1.00; any two of the above, 75c; any one of above, 50c; copper analysis, \$1; platinum, nickel or tin, \$5.00.
Write for full price list and mailing envelopes

ADOLF FRESE
Maker and Repairer

of Transits, Levels and all other instruments used in mining. Fine assorted stock of Keuffel and Esser goods. Also Microscopes, Barometers, Field Glasses, Thermometers, Hydrometers, etc.

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Los Angeles, California

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LUMBER

The Southern California Lumber Co., Stimson Bldg., Los Angeles, Cal.

At Wholesale Prices

Mining Timbers a Specialty

Write for Prices

FROM CRIPPLE CREEK

AIR COMPRESSORS
ROCK DRILLS,
Stone Channelers,
The Pohle Air Lift Pump,
Coal Cutters,

THE INGERSOLL-SERGEANT DRILL COMPANY, HAVEMEYER BUILD'G
NEW YORK
PARKE & LACY CO., AGENTS, SAN FRANCISCO, CAL.

New Catalogue No. 32

New Catalogue No. 41

Pamphlet No. 100

Catalogue No. 72

Special.

JAMES F. BURNS, Pres't.

JOHN HARNAN, Gen. Man.

FRANK O. BECK, Sec'y and Treas.

THE PORTLAND GOLD MINING CO.,

(Stock Transfer Office, Colorado Springs.)

Mines at Victor, Colorado.

COLORADO SPRINGS, COLO., May 19, 1898

The Ingersoll-Sergeant Drill Co.,

Gentlemen:—We bought two years ago one of the largest

size of the straight line type of Ingersoll-Sergeant Piston

Inlet Compressor.

This was found to be too small for our needs about a year

ago and we purchased of you a Duplex Corliss machine

16" x 18" x 42".

This was set in place in our shaft house in the Cripple Creek

District, 10,000 feet above the level of the sea, and has been

running continuously ever since, and at times over 100

Eclipse drills. The steam cylinders were connected to an in-

dependent Jet Condenser, for which we are using themine

water, and the resultant economy of operation is very

noticeable.

The operation of this Compressor is as near perfect as

that of any machine we have ever seen, and this type is well

worth the extra cost on account of the great permanent

economy in operation.

Our mine is equipped exclusively with your drills and we

have only the highest words of praise to give them.

Yours very truly, The Portland Gold Mining Co.,

Jas. A. Burns, President

INCORPORATED MINES PAYING DIVIDENDS.

	NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of Last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Minerals Produced
1	Aetna Cons.	California	100,000	500,000	\$ 5	\$ 10	Oct 1899	\$ 195,000	Q.
2	Alamo	Utah	125,000	125,000	1	02	April 1899	2,500	G, C, L.
3	Alaska, Treadwell	Alaska	200,000	5,000,000	25	37½	July 1899	4,145,000	G.
4	Alaska Mexican	Alaska	200,000	1,000,000	5	10	July 1899	411,031	G.
5	Anaconda Copper	Montana	1,200,000	30,000,000	25	2 00	Nov 1899	12,150,000	G.
6	Anchoria Leland	Colorado	600,000	600,000	1	03	Apr 1899	198,000	G.
7	American Gold	Colorado	300,000	3,000,000	10	09	June 1899	434,000	G, S, L.
8	American Coal	Maryland	60,000	1,500,000	25	1 25	Sept 1899	727,500	Coal
9	American Zinc, Lead and Smelting	Missouri	200,000	500,000	25	10	Oct 1899	40,000	Z, L.
10	Aurora	Michigan	100,000	2,500,000	25	50	June 1899	890,000	L.
11	Argonaut	California	200,000	2,000,000	10	10	Aug 1899	340,000	
12	Bald Butte	Montana	250,000	250,000	1	08	Sept 1899	747,141	G, C, S.
13	Bonanza Development	New Mexico	300,000	8,000,000	10	3 50	June 1899	1,500,000	
14	Boston & California	California	600,000	600,000	1	04	June 1899	72,000	
15	Boston & Colorado Smelting	Colorado	15,000	750,000	50	5 00	April 1899	375,000	
16	Boston & Montana Con.	Montana	150,000	3,750,000	25	10 00	Aug 1899	12,275,000	G, C, S.
17	Breece	Colorado	200,000	5,000,000	25	05	Sept 1899	60,000	L.
18	Bullion Beck and Champion	Utah	100,000	1,000,000	10	10	Sept 1899	2,408,400	G, S.
19	Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	07	May 1899	705,000	S, L.
20	Cariboo	British Col.	800,000	800,000	1	01½	Feb 1899	248,965	G.
21	Calumet & Hecla	Michigan	10,000	8,500,000	25	20 00	Sept 1899	64,850,000	C.
22	Centennial Eureka	Utah	30,000	1,500,000	50	50	Aug 1899	2,150,000	S, L.
23	Central Lead	Missouri	10,000	1,000,000	100	50	Sept 1899	127,000	L.
24	Charleston	S. Carolina	10,000	1,000,000	100	2 00	June 1899	200,000	
25	Colorado Smelting	Montana	100,000	1,000,000	10	1 00	Jan 1899	1,945,000	G, S, C.
26	Consolidated Tiger and Poorman	Idaho	1,000,000	1,000,000	1	02	Dec 1898	20,000	G, S.
27	Creston Leasing	Colorado	1,000,000	1,000,000	1	01	Dec 1898	54,000	
28	Crowned King	Arizona	600,000	6,000,000	10	02	Dec 1898	232,000	G, S, L.
29	De Lamar	Idaho	400,000	2,000,000	5	12	May 1899	2,346,000	G, S.
30	Deer Trail No. 2	Washington	1,000,000	1,000,000	1	25	Sept 1899	40,000	
31	Doe Run	Missouri	5,000	500,000	100	50	Sept 1899	85,000	L.
32	Empire State Idaho	Idaho	75,000	750,000	10	30	Sept 1899	229,375	
33	Fanny Rawlings	Colorado	1,000,000	1,000,000	1	01	Aug 1899	20,000	G, S.
34	Ferris-Haggerty	Wyoming	1,000,000	1,000,000	1	00½	Mar 1899	5,000	C, G, S.
35	Garfield Consolidated	Colorado	1,200,000	1,200,000	1	01	May 1899	34,000	G.
36	Golden Star	Ontario, Canada	100,000	100,000	1	01	July 1899	41,000	
37	Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	01	Sept 1899	240,000	G.
38	Gold King	Colorado	1,000,000	1,000,000	1	03	July 1899	60,000	G.
39	Golden Cycle	Colorado	200,000	1,000,000	5	05	Sept 1899	228,500	
40	Grand Central	Utah	250,000	250,000	1	24	Sept 1899	666,250	G, S, C, L.
41	Gwin	California	20,000	1,000,000	50	25	Aug 1899	81,500	G.
42	Grass Valley Exploration	California	50,000	100,000	2	25	July 1899	12,500	
43	Helena and Frisco	Idaho	500,000	2,500,000	5	25	June 1899	550,000	S, L.
44	Highland	S. Dakota	100,000	10,000,000	100	20	July 1899	3,924,718	G.
45	Holy Terror	S. Dakota	300,000	300,000	1	01	July 1899	142,000	G.
46	Homestake	S. Dakota	125,000	12,500,000	100	50	Sept 1899	7,828,750	G.
47	Horn Silver	Utah	400,000	10,000,000	25	05	July 1899	5,270,000	S, L.
48	Idaho	British Col.	500,000	500,000	1	05½	Jan 1899	292,000	
49	Isabella	Colorado	2,250,000	2,250,000	1	01	Sept 1899	472,500	G.
50	Jack Pot	Colorado	1,000,000	1,000,000	1	04	Sept 1899	75,000	G.
51	Jamison	California	390,000	3,900,000	10	10	April 1899	50,700	
52	Lake Superior Iron	Michigan	84,000	2,100,000	25	1 00	Feb 1899	736,000	L.
53	Lillie	Colorado	1,000,000	1,000,000	1	05	Sept 1899	279,110	G.
54	Modoc	Colorado	500,000	500,000	1	02	Sept 1899	170,000	G.
55	Montana Ltd	Montana	660,000	3,300,000	5	12	Apr 1899	2,997,557	G, S.
56	Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	Sept 1899	1,280,000	
57	Morning Star	California	2,400	240,000	100	3 00	Sept 1899	744,800	G.
58	Mercur	Utah	200,000	5,000,000	25	12½	July 1899	1,291,000	G.
59	Mammoth	Utah	400,000	10,000,000	25	15	Sept 1899	1,530,000	G, S, C, L.
60	Mead	California	2,000,000	2,000,000	1	20	June 1899	120,000	G.
61	Monument	Colorado	300,000	300,000	1	01	Dec 1898	12,624	
62	Moulton	Montana	400,000	2,000,000	5	05	Feb 1899	480,000	
63	Mt. Shasta	California	20,000	100,000	5	30	May 1899	6,000	
64	New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	Sept 1899	1,110,000	S, G.
65	Napa Cons	California	100,000	700,000	7	30	Oct 1899	1,040,000	Q.
66	New Idria Quicksilver	California	100,000	500,000	5	30	Oct 1899	170,000	Q.
67	North Star	California	200,000	2,000,000	10	25	Apr 1899	550,000	G.
68	Original Empire	California	50,000	5,000,000	100	1 00	May 1899	500,000	G.
69	Osceola	Michigan	50,000	1,250,000	25	3 00	June 1899	2,801,500	C.
70	Parrot	Montana	230,000	2,300,000	10	1 50	May 1899	2,690,898	C.
71	Pennsylvania Consolidated	California	51,500	5,150,000	10	20	Sept 1899	105,575	
72	Pioneer	California	100,000	1,000,000	10	12½	Mar 1899	62,500	G.
73	Portland	Colorado	3,000,000	3,000,000	1	02	Sept 1899	2,347,080	G, S.
74	Plumbago	California	300,000	300,000	1	15	Jan 1899	45,000	G.
75	Quicksilver Pref	California	43,000	4,300,000	100	50	May 1899	1,845,411	Q.
76	Quicksilver Consolidated	California	57,000	5,700,000	100	40	July 1899	643,867	Q.
77	Quincy	Michigan	100,000	2,500,000	25	6 00	August 1899	11,070,000	C.
78	*Republic Consolidated	Washington	3,000,000	3,000,000	1	01	Sept 1899	323,000	G.
79	Rambler-Cariboo	British Col.	1,000,000	1,000,000	1	01	April 1899	50,000	
80	Royal Consolidated	British Col.	2,500,000	2,500,000	1	01	June 1899	1,050,000	G.
81	Sacramento	Utah	1,000,000	5,000,000	5	00½	Sept 1899	133,000	G.
82	Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	Feb 1899	3,325,000	S.
83	South Swansea	Utah	150,000	150,000	1	05	Sept 1899	150,000	S, L.
84	Standard	Idaho	500,000	500,000	1	06	Apr 1899	1,745,000	G, S.
85	Standard Consolidated	California	200,000	20,000,000	100	10	Aug 1899	3,879,226	G, S.
86	St. Joseph	Missouri	30,000	3,000,000	10	50	June 1899	2,859,500	L.
87	Silver King	Utah	150,000	3,000,000	20	25	Sept 1899	2,250,000	S, L, G.
88	Smuggler	Colorado	1,000,000	1,000,000	1	01	Sept 1899	1,185,000	S, L, Z.
89	Swansea	Utah	100,000	500,000	5	05	Oct 1899	241,000	S, L.
90	Tamarack	Michigan	60,000	1,500,000	15	4 00	June 1899	5,910,000	C.
91	Tomboy	Colorado	200,000	2,000,000	10	4 00	May 1899	730,000	G.
92	Utah	Utah	100,000	1,000,000	10	02	Jan 1899	179,000	G.
93	Indicator Consolidated	Colorado	1,500,000	1,500,000	1	05	July 1899	253,750	G.
94	War Eagle Consolidated	British Col.	2,000,000	1,000,000	1	01½	Sept 1899	414,000	
95	Wolverine	Michigan	60,000	2,500,000	25	1 50	Oct 1899	270,000	C.
96	Yellow Aster	California	100,000	1,000,000	10	10	Sept 1899	253,789	G.

S. Silver; G. Gold; L. Lead; C. Copper; Q. Quicksilver; I. Iron; Z. Zinc.

N. B.—Companies not listed paid nothing in the last twelve months. *Paid since consolidation, \$203,000; Republic paid \$120,000 under old management.

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Designed with some Regard for the Laws of Concentration

The perfect vanner motion given to the pulp by our head motion together with the freedom from "jumping" resulting from the special rigid guides used, explains why the Cammett riffles never "pack," and why the table has such a great capacity when handling slimes.

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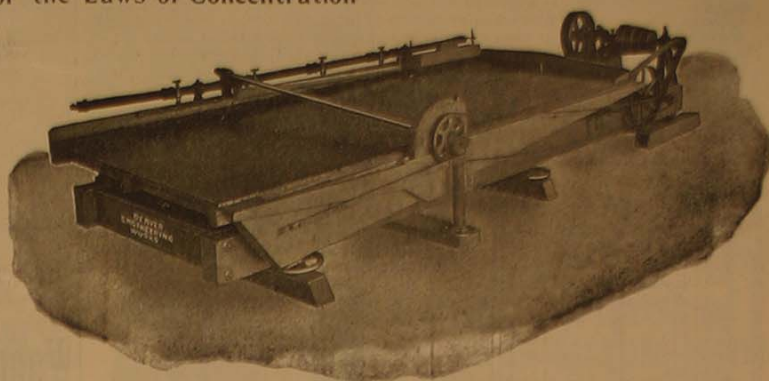
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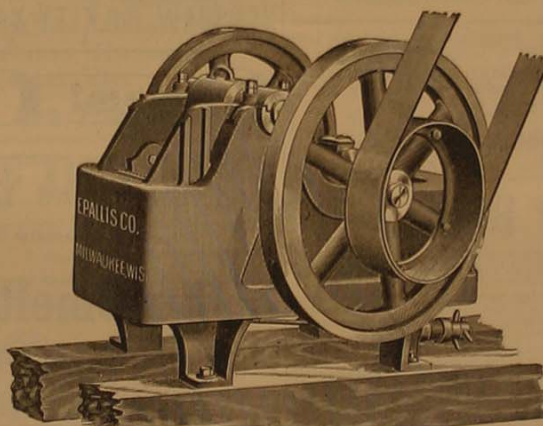
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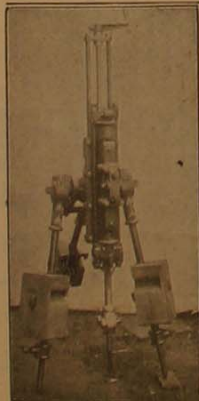
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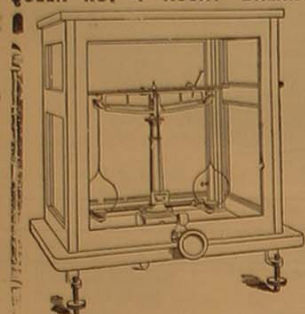


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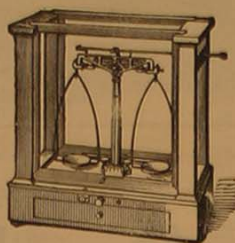
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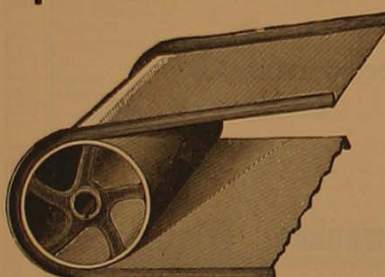
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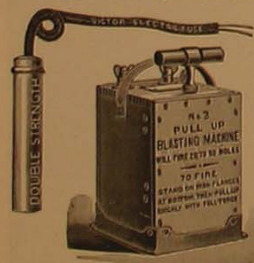
This illustration shows the edge flanging outwardly as it passes over the pulley. This relieves the strain from the top and bottom of the edge by directing the strain automatically to the inside face surface of the edges. Heretofore all belts have been so constructed that when they pass over the pulleys or rolls, a direct strain comes upon the top or at the base of the edges, causing the edges to break away from the body of the belts in a very short time. We avoid this Mechanical Defect by our Spadone Curved Edge Belts made to fit any machine—4, 5 and 6 feet wide. Prices and samples on application.

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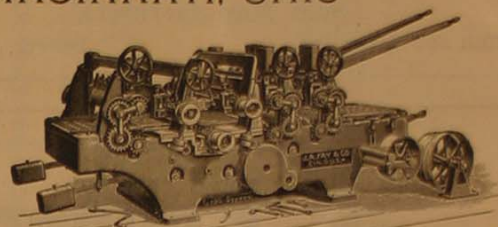
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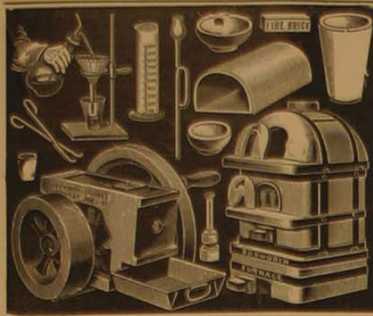
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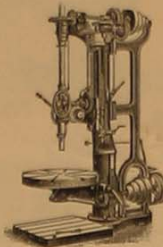
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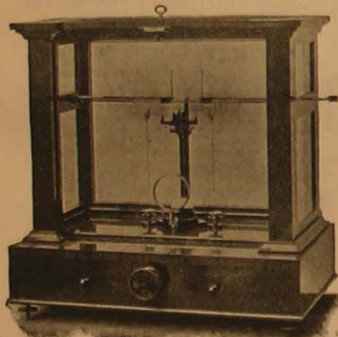
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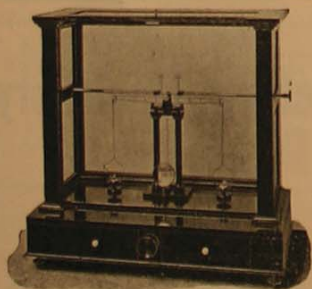


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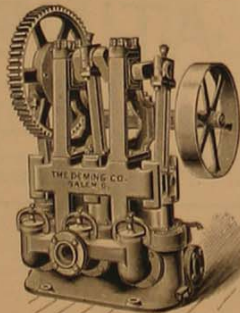
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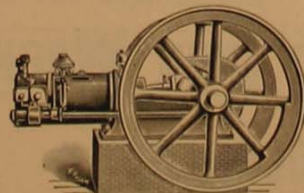
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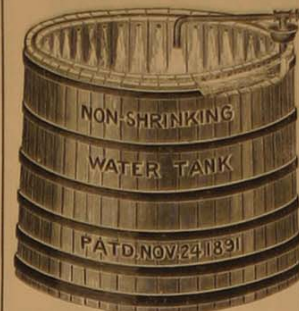
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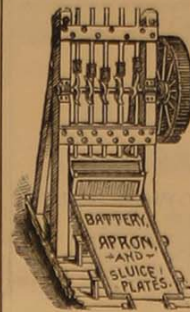
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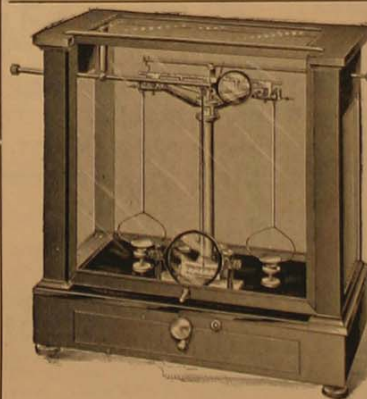
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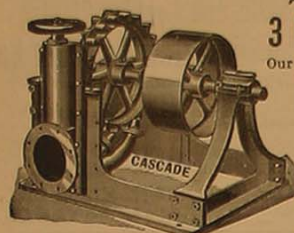
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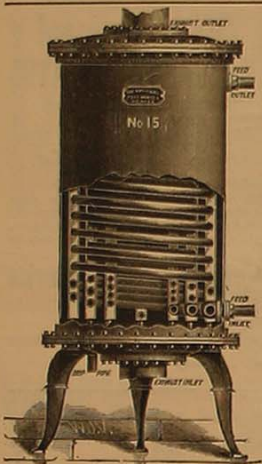


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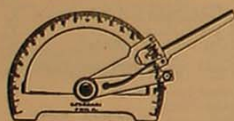
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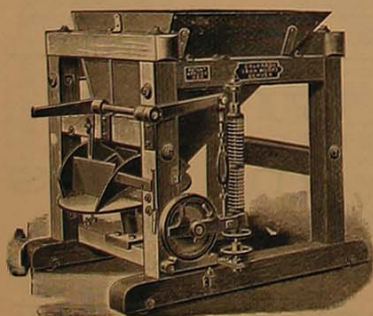
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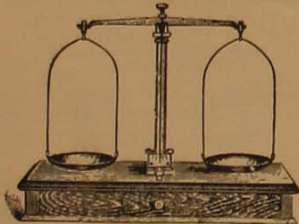
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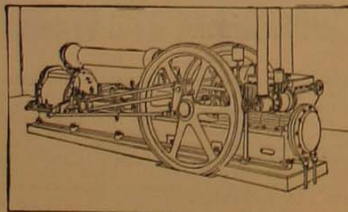


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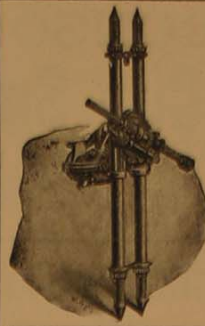
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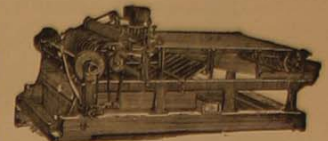
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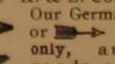
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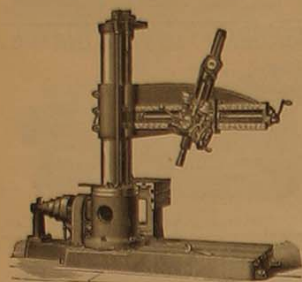
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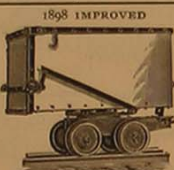
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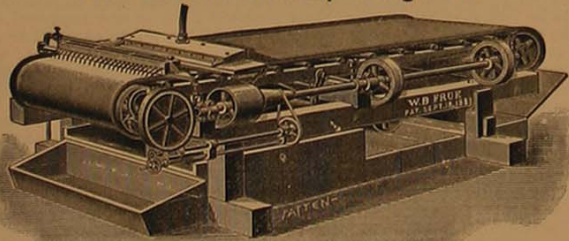
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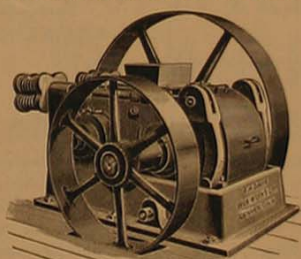
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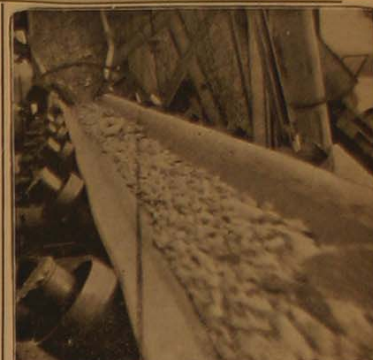
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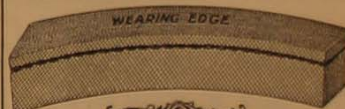


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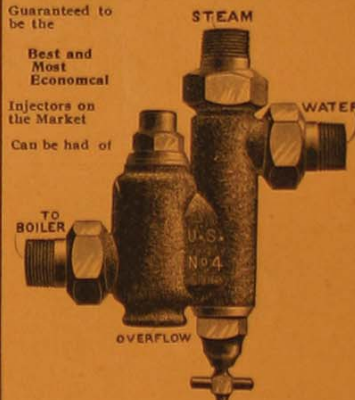
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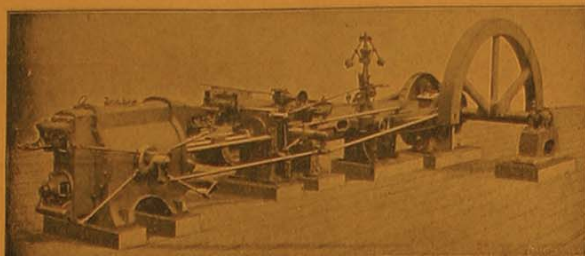
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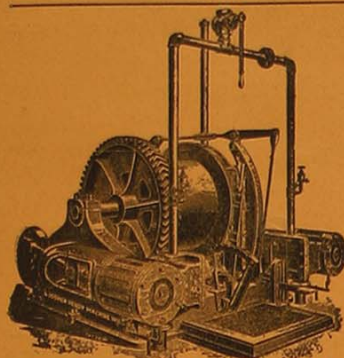
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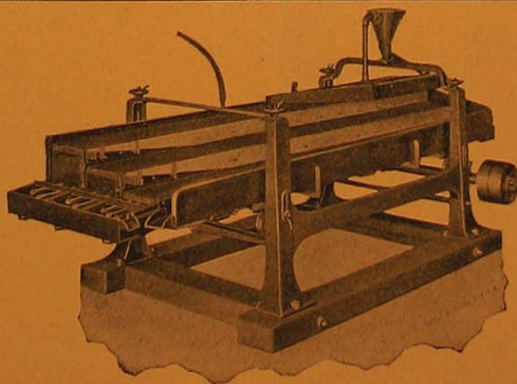
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